

VOL. XXXIX No. 8

AUGUST 1954

# MECCANO

## MAGAZINE



TUGS ON THE MERSEY





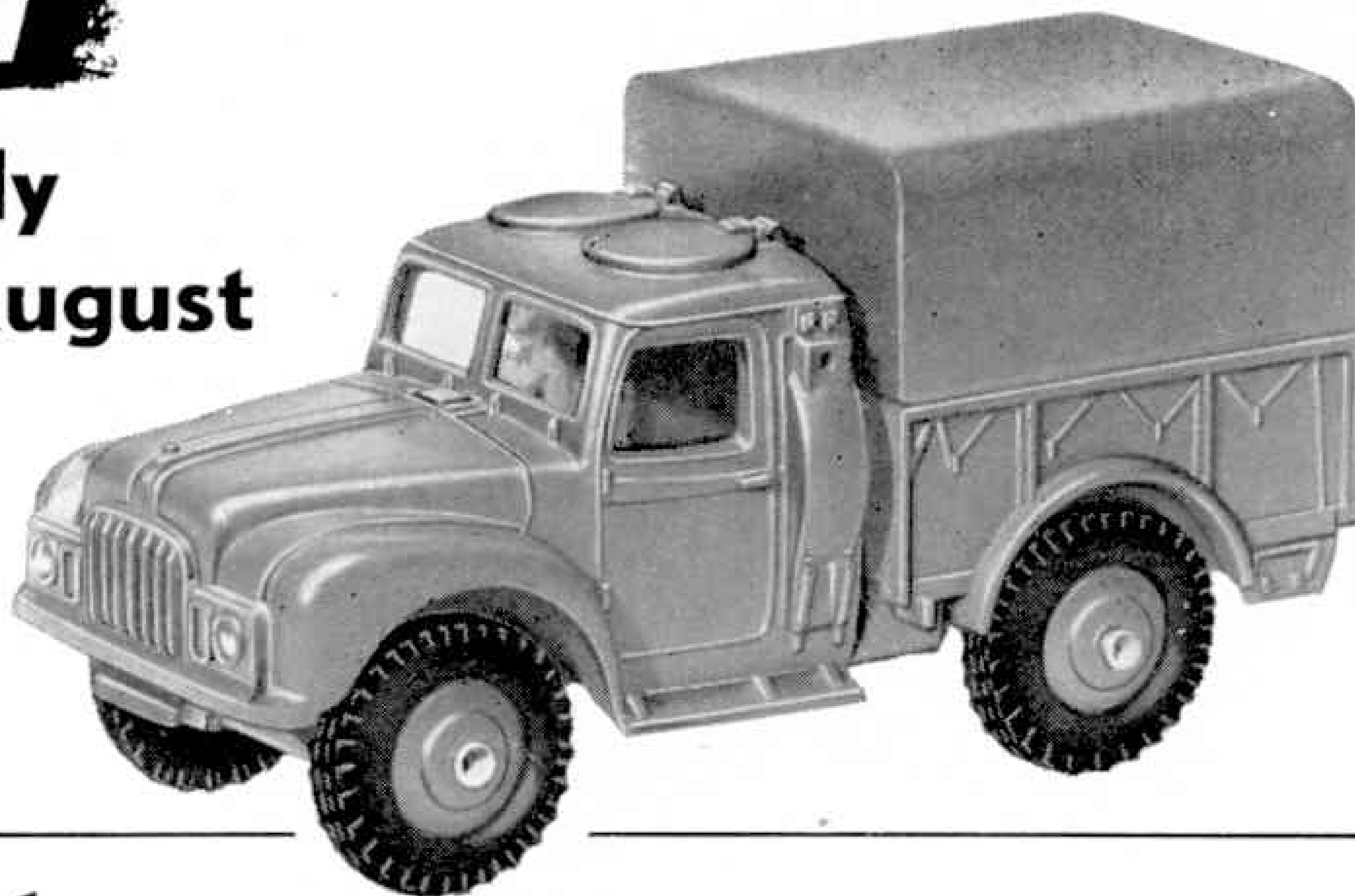
THE MECCANO MAGAZINE

# DINKY TOYS

TRADE MARK REGD

**NEW**

**Ready  
during August**



**No. 641**

## **ARMY 1-TON CARGO TRUCK**

Dinky Toys equipment for the "playroom army" is rolling off the production lines, and this month's newcomer is an excellent little model of the Army 1-ton Cargo Truck, a handy 4-wheel drive all-purpose vehicle used mainly for light transport duties. This miniature is complete with driver, and the hood of the body is detachable. There is seating for personnel, and the vehicle is notable for fine detail including observation hatches in cab roof and spare wheel cover. The finish is service green with the Royal Armoured Corps sign on the front and rear. Overall length  $3\frac{1}{8}$  in.

**Price 3/9**

*(including Tax)*



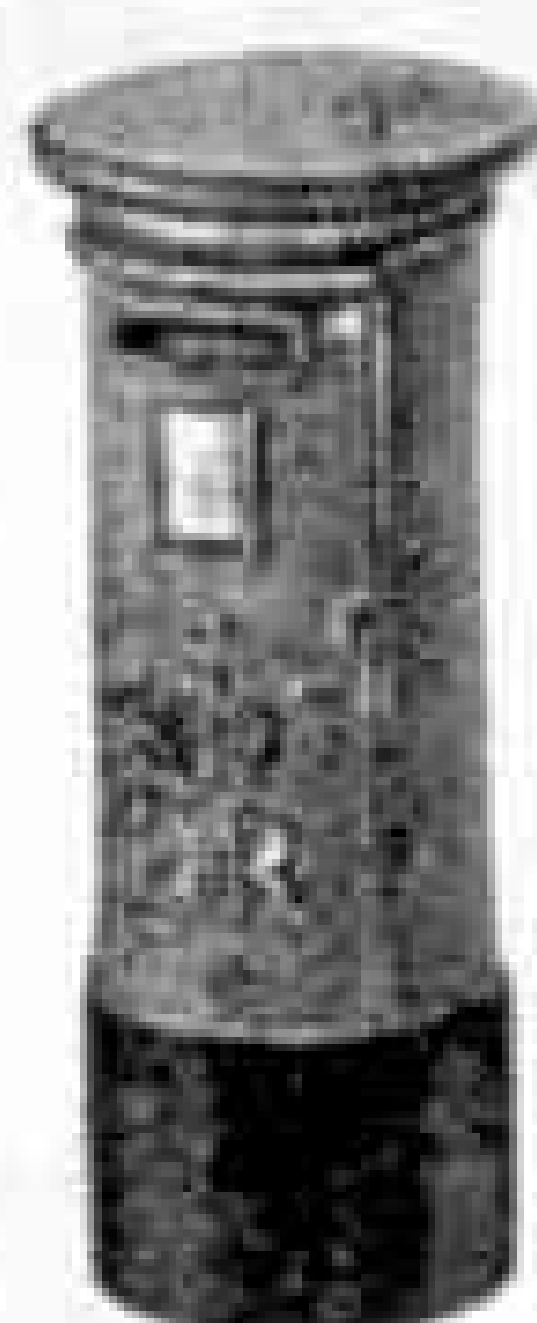
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# DINKY TOYS

TRADE MARK REGD.



No. 674  
Austin Champ  
Army Vehicle  
with driver  
Length  $2\frac{5}{8}$  in.  $3/6$



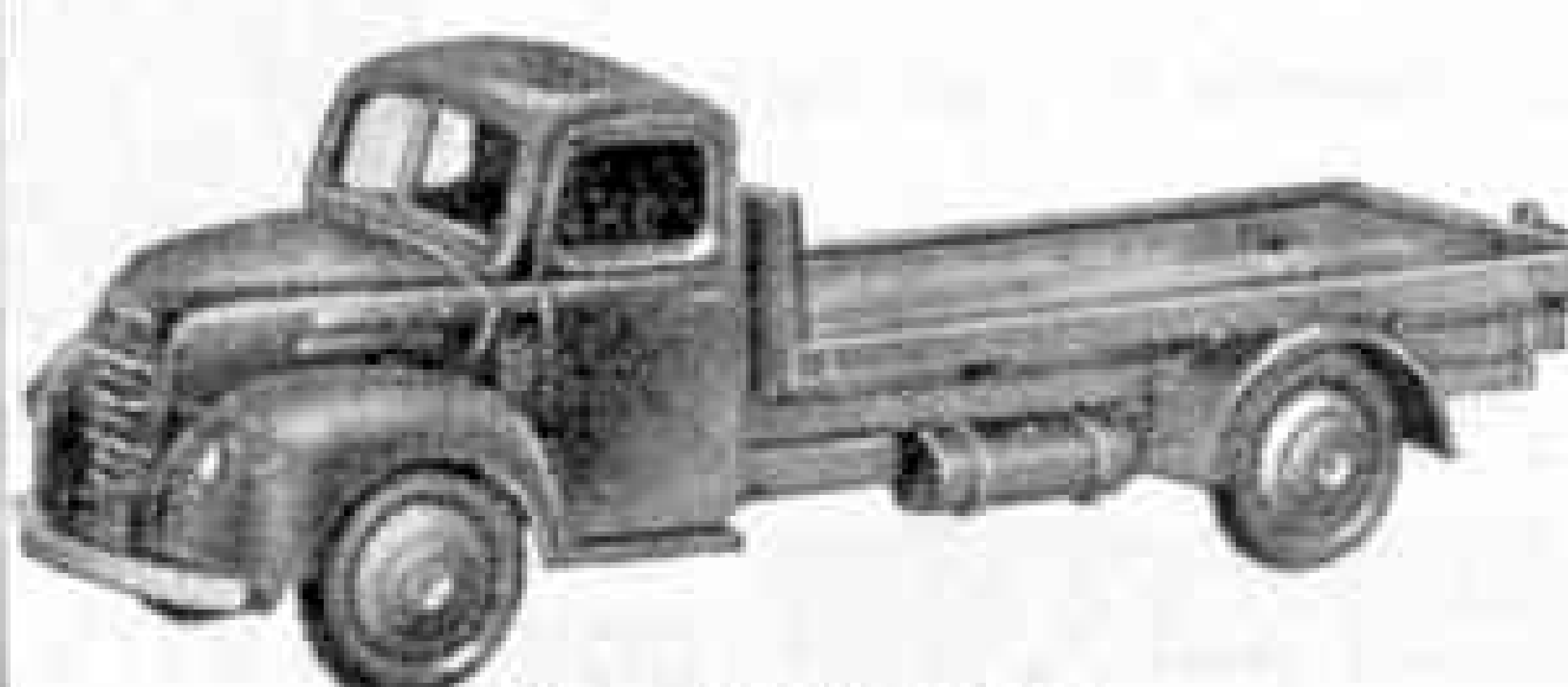
No. 760  
G.P.O.  
Pillar Box  
Height  $1\frac{5}{8}$  in.  
10d.



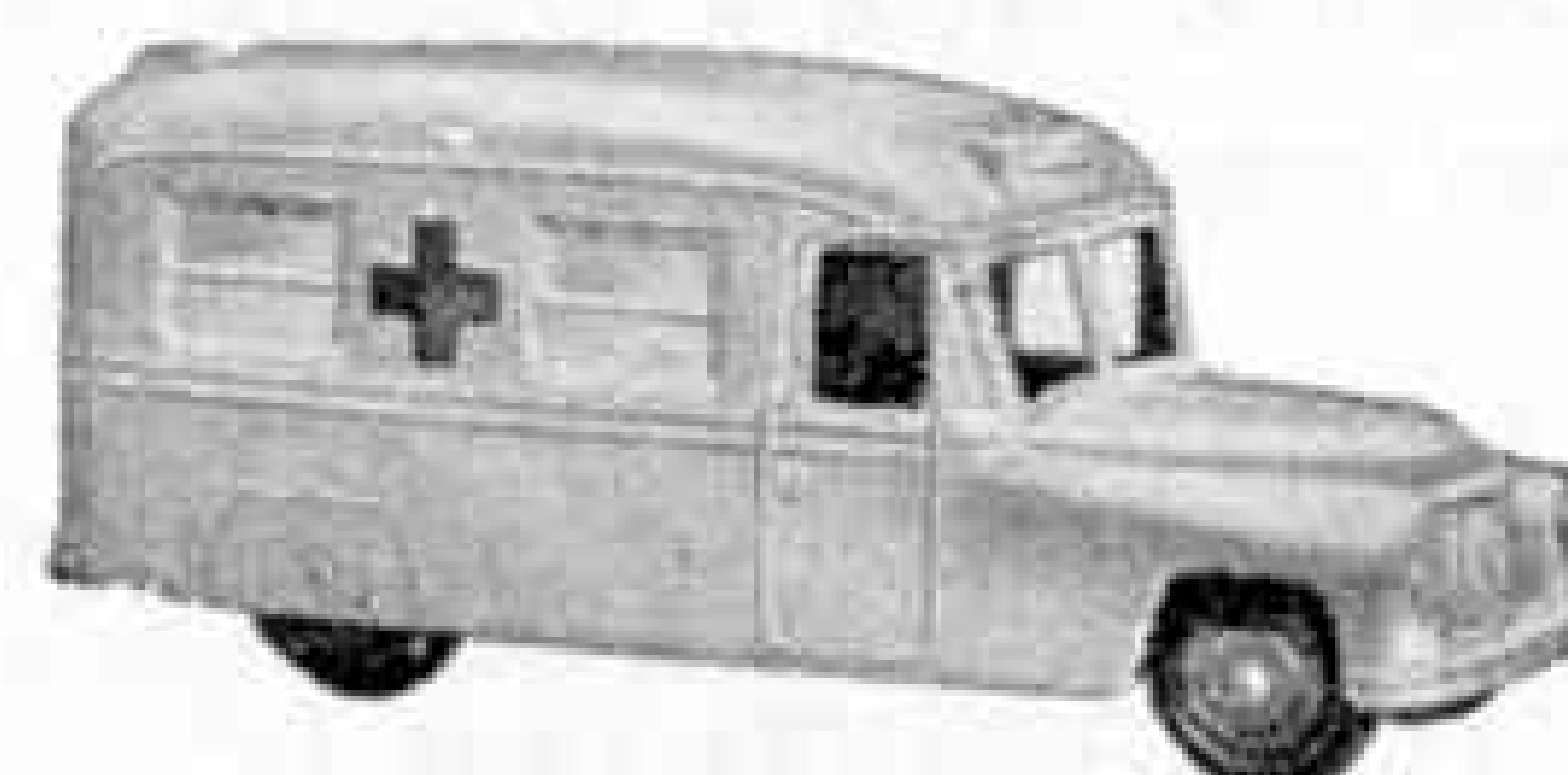
No. 154 (40f)  
Hillman Minx  
Length  $3\frac{1}{2}$  in.  $2/2$



No. 470  
Austin Van "Shell/B.P."  
Length  $3\frac{1}{2}$  in.  $2/11$



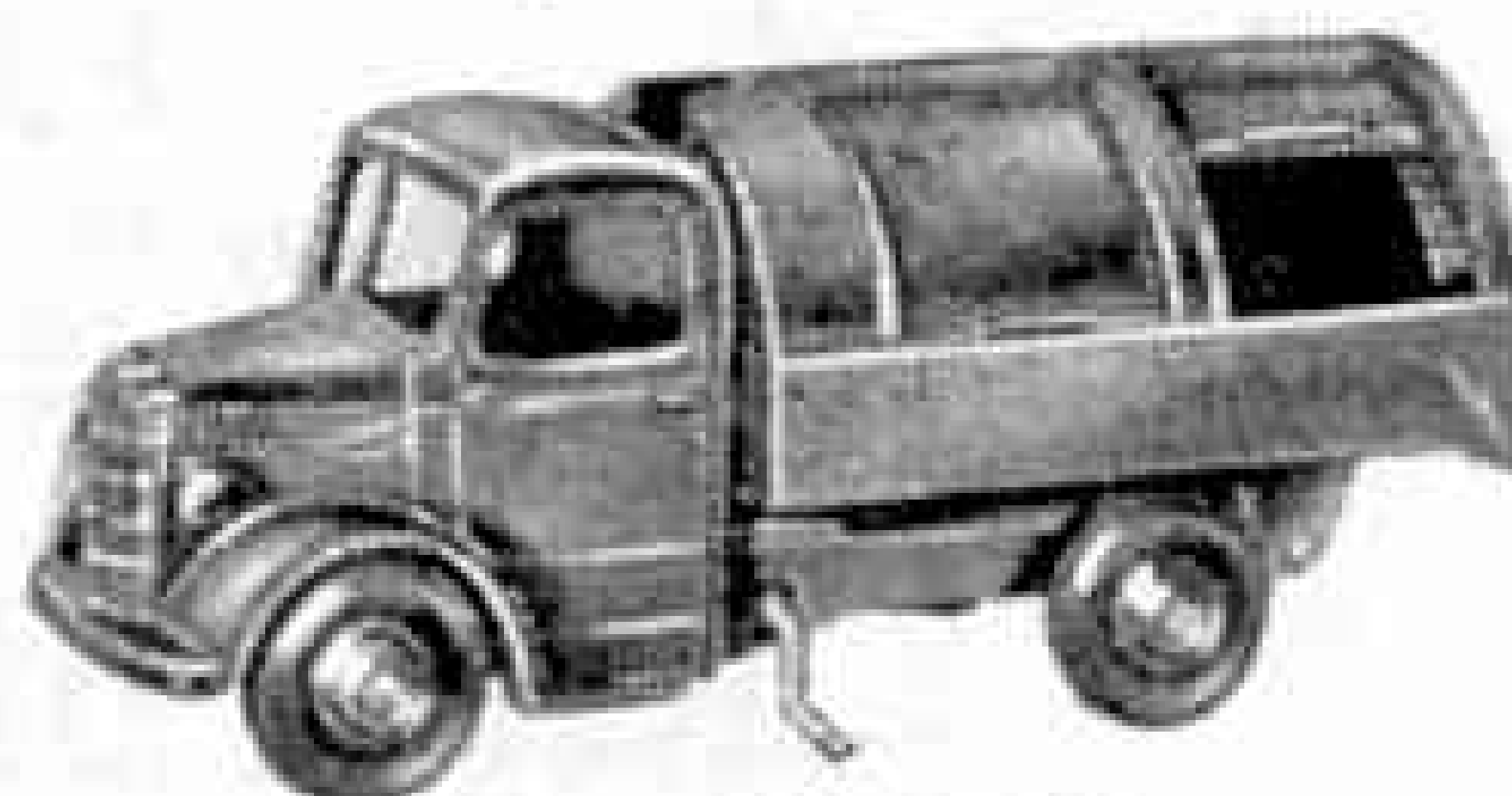
No. 422 (30r)  
Fordson "Thames" Flat  
Truck  
Length  $4\frac{1}{8}$  in.  $2/6$



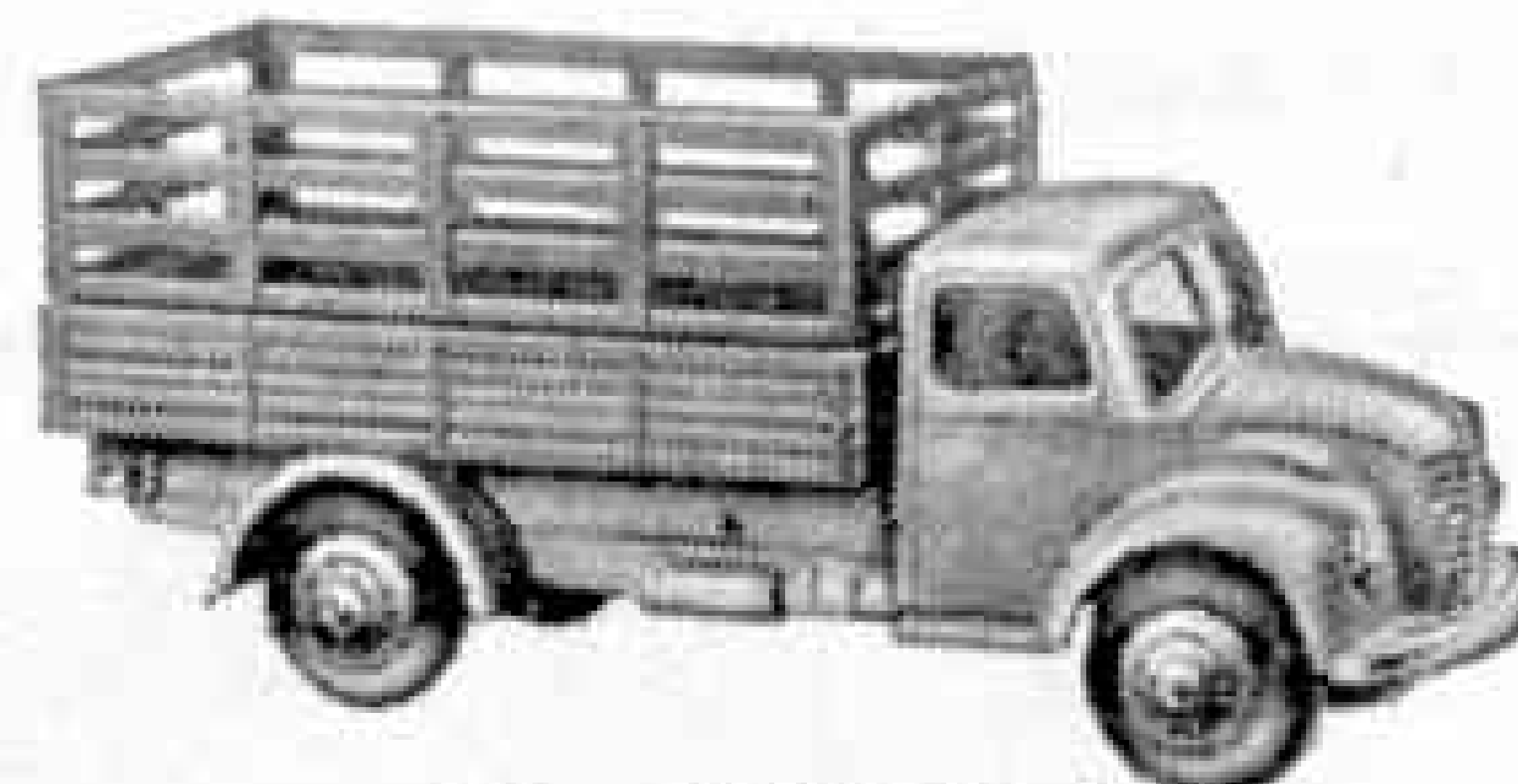
No. 253 (30h)  
Daimler Ambulance  
Length  $3\frac{3}{4}$  in.  $2/11$



No. 480  
Bedford 10 cwt. Van "Kodak"  
Length  $3\frac{1}{4}$  in.  $2/9$



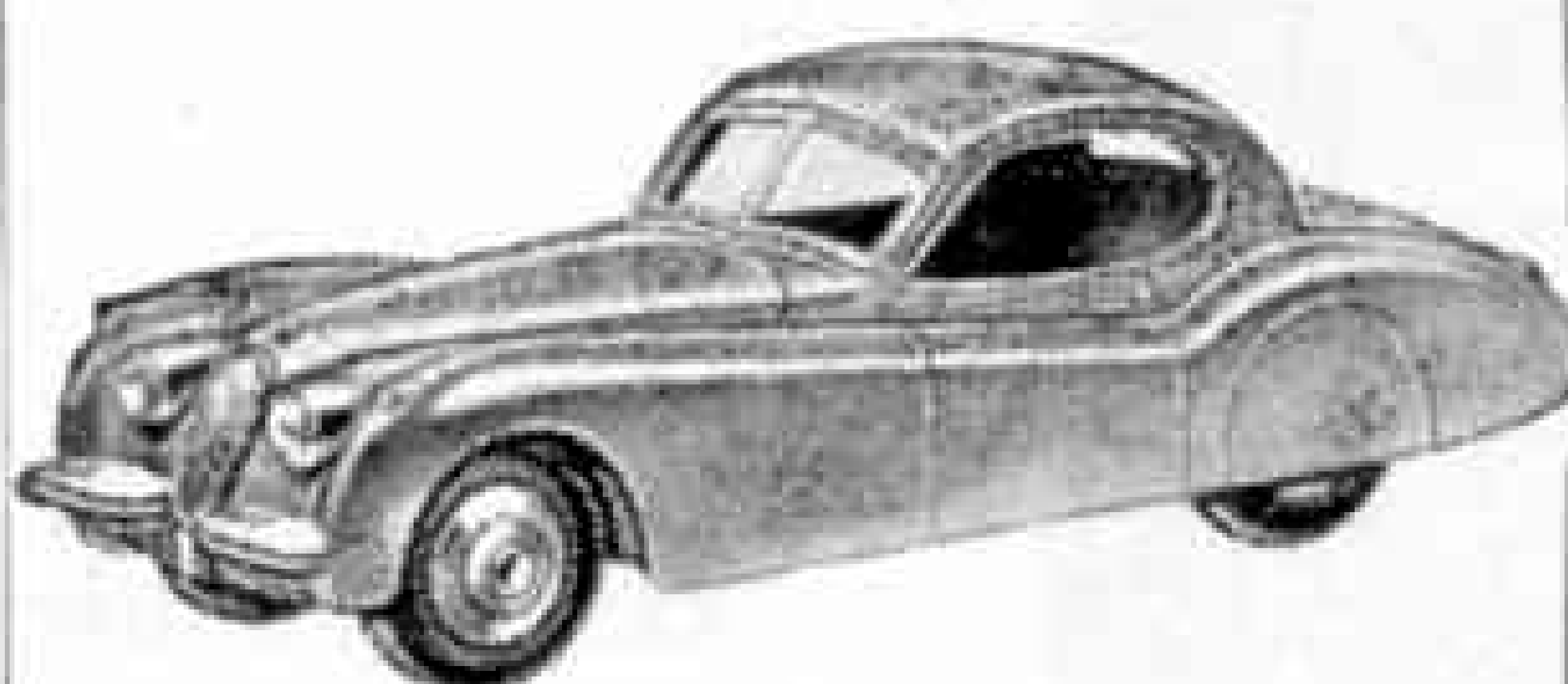
No. 252 (25v)  
Refuse Wagon  
Bedford Chassis  
Length  $4\frac{1}{2}$  in.  $5/10$



No. 343 (30n)  
Farm Produce Wagon  
Length  $4\frac{1}{4}$  in.  $3/6$



No. 673  
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Length  $2\frac{5}{8}$  in.  $2/11$



No. 157  
Jaguar XK120 Coupé  
Length  $3\frac{7}{8}$  in.  $2/8$



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No. 172  
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Length  $3\frac{7}{8}$  in.  $3/7$

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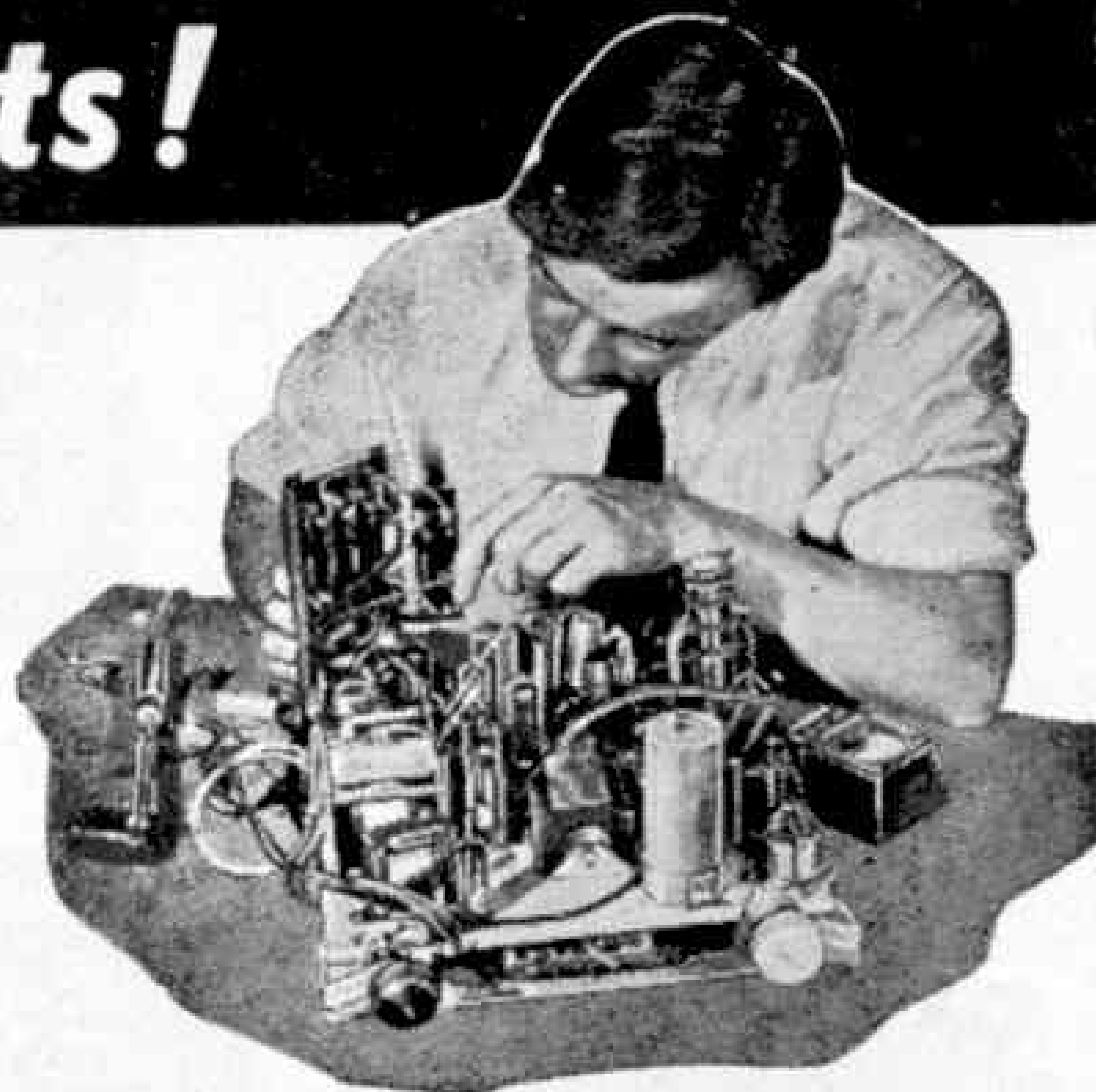
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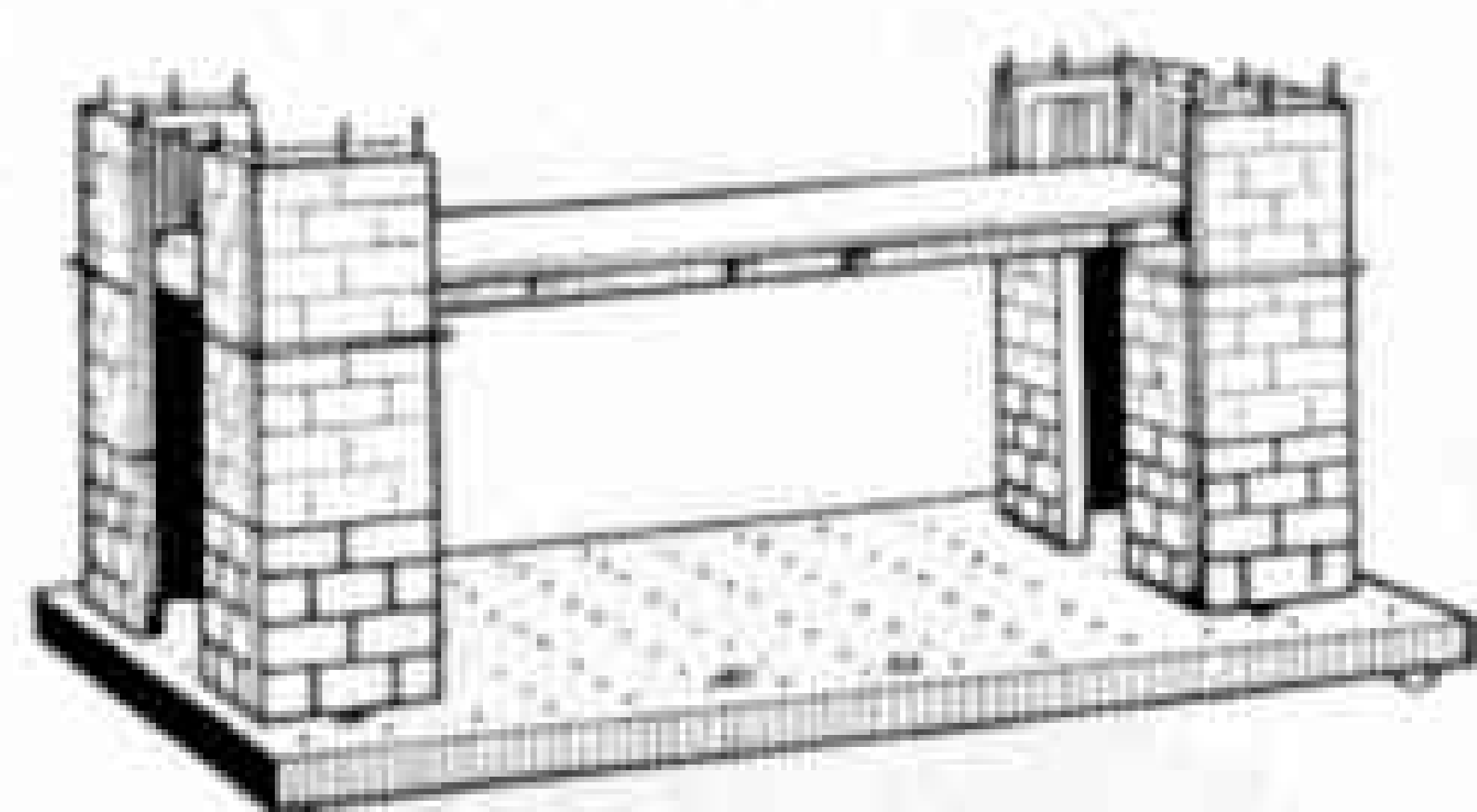


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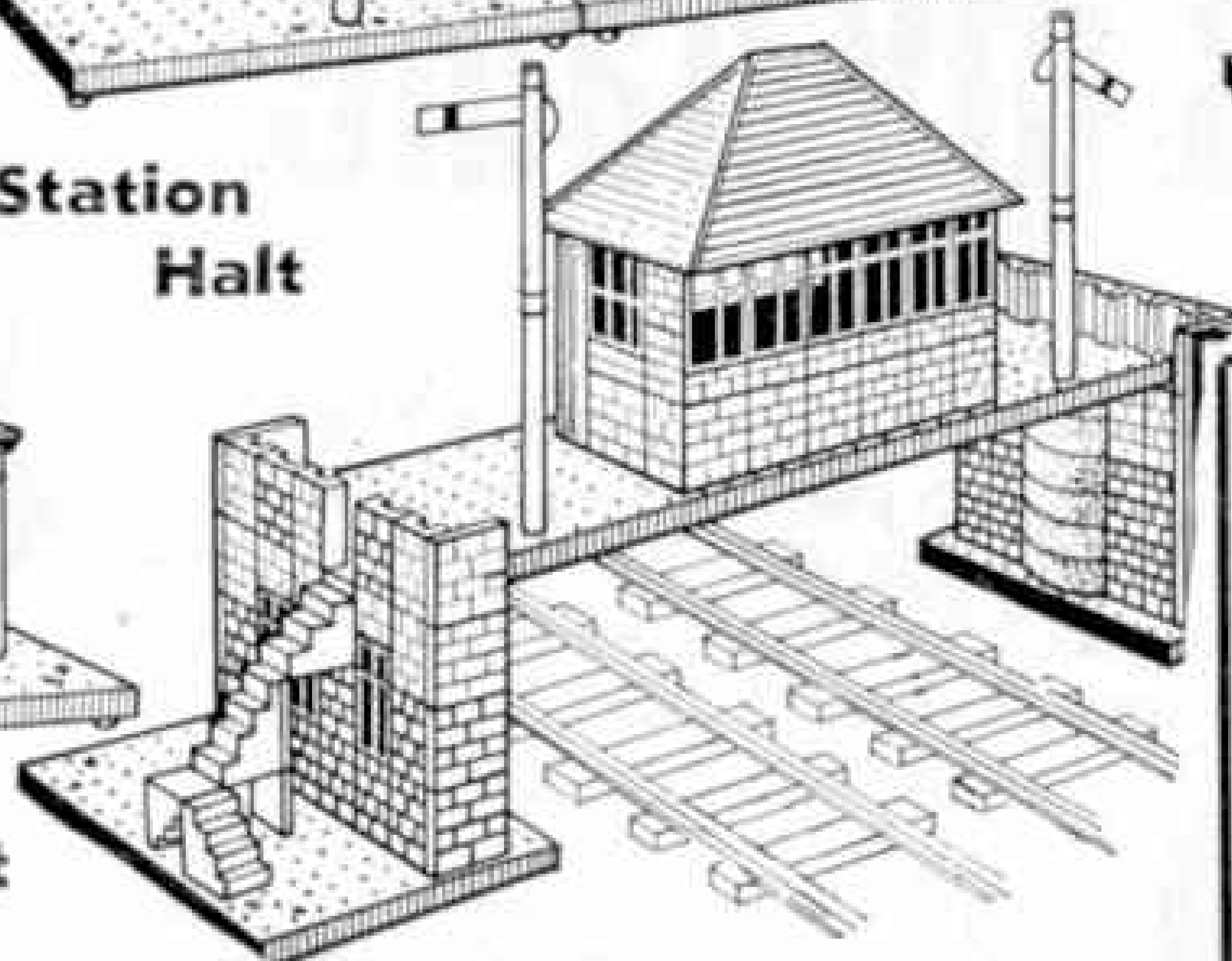


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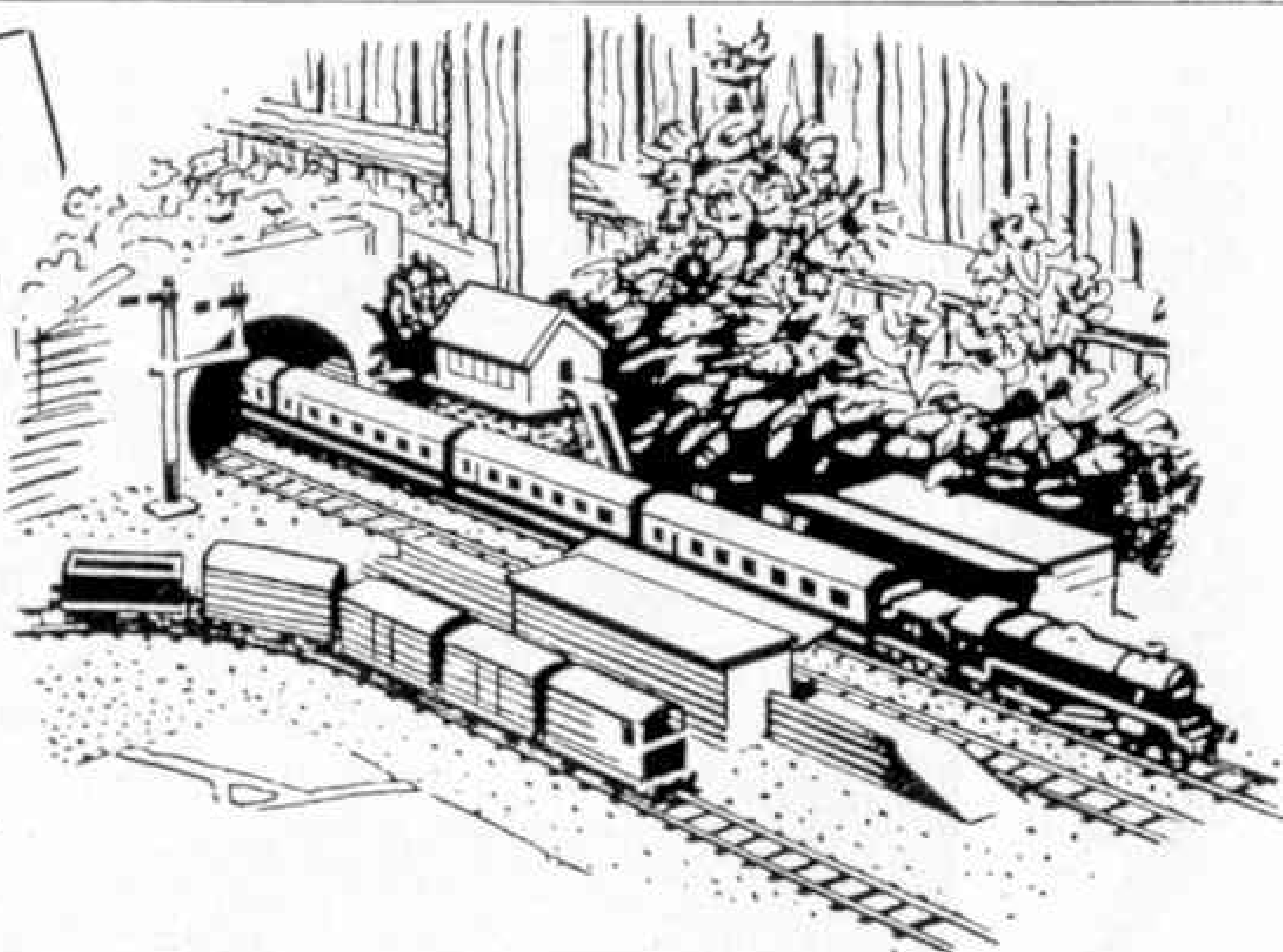


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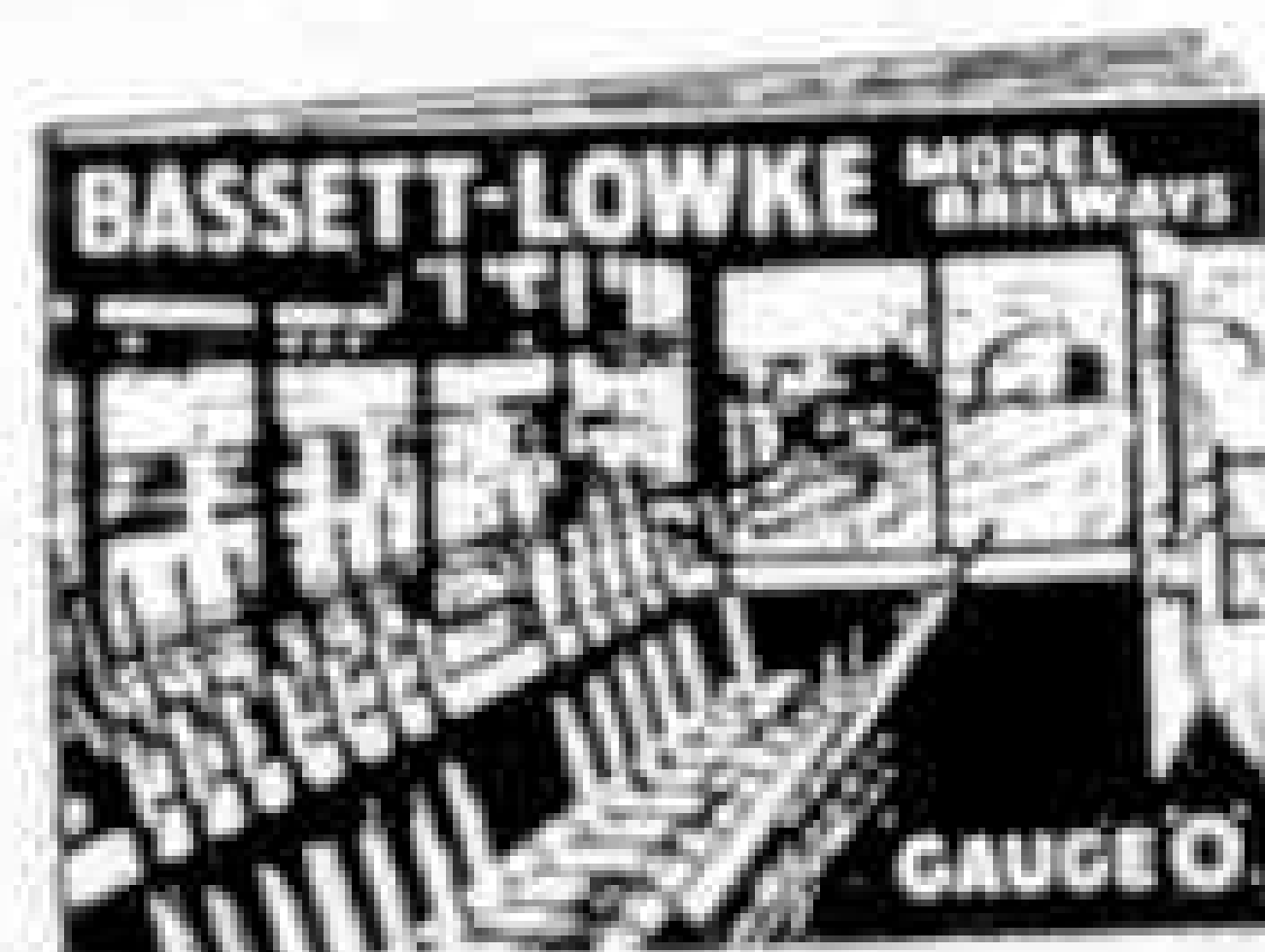
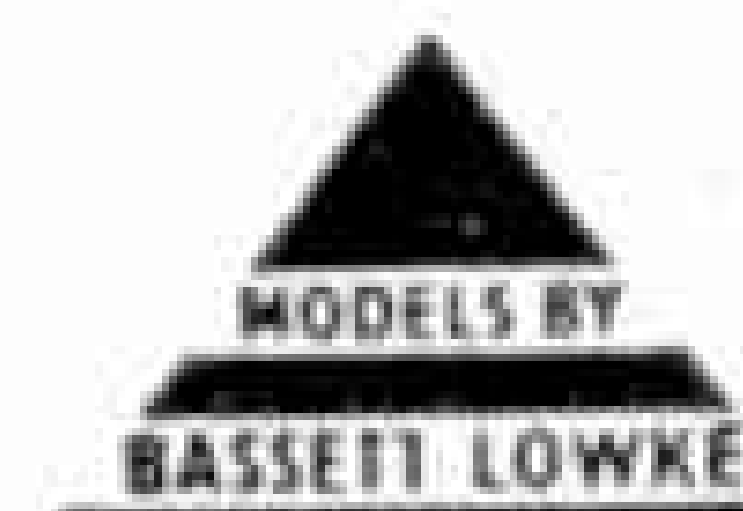


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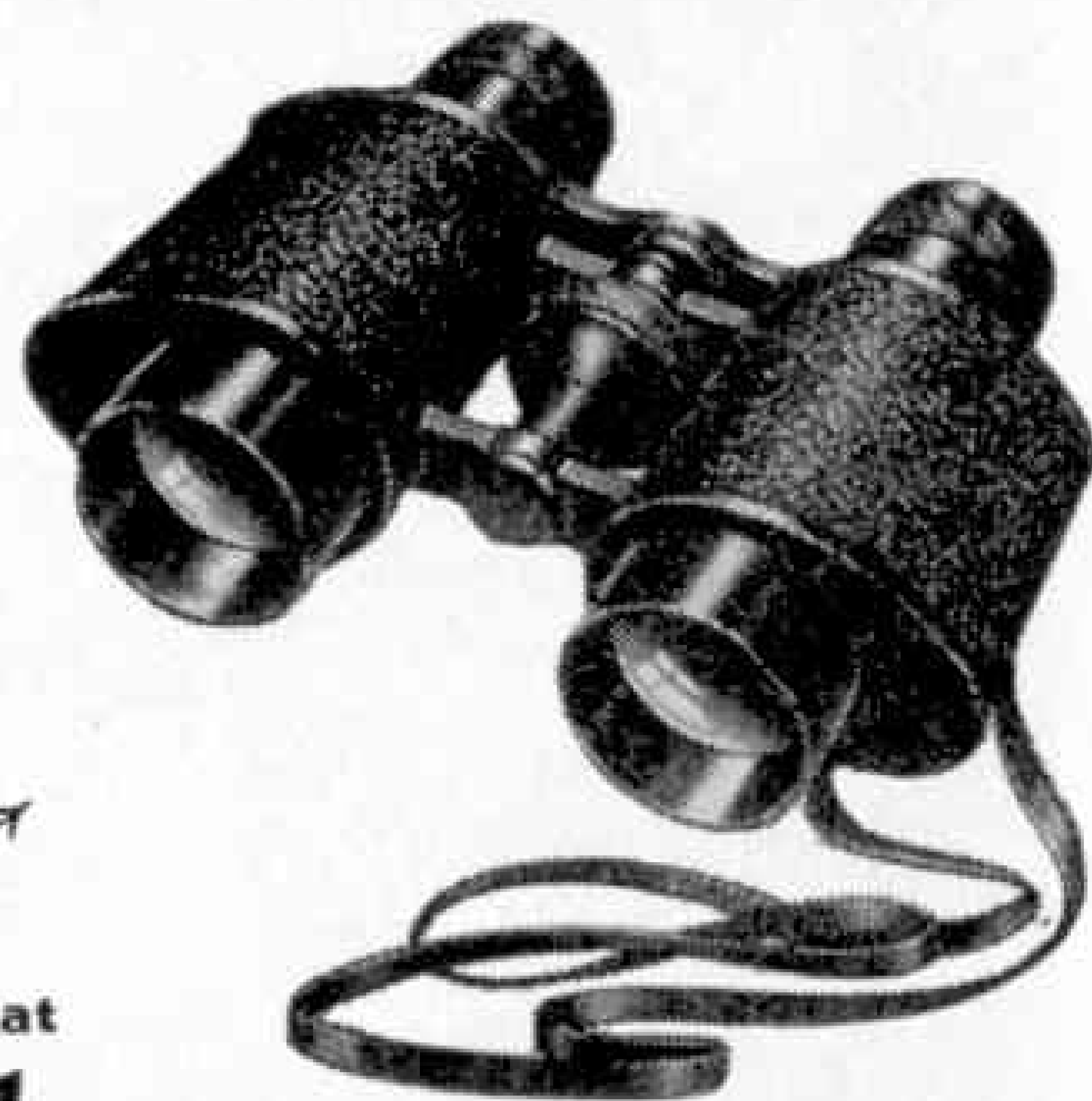


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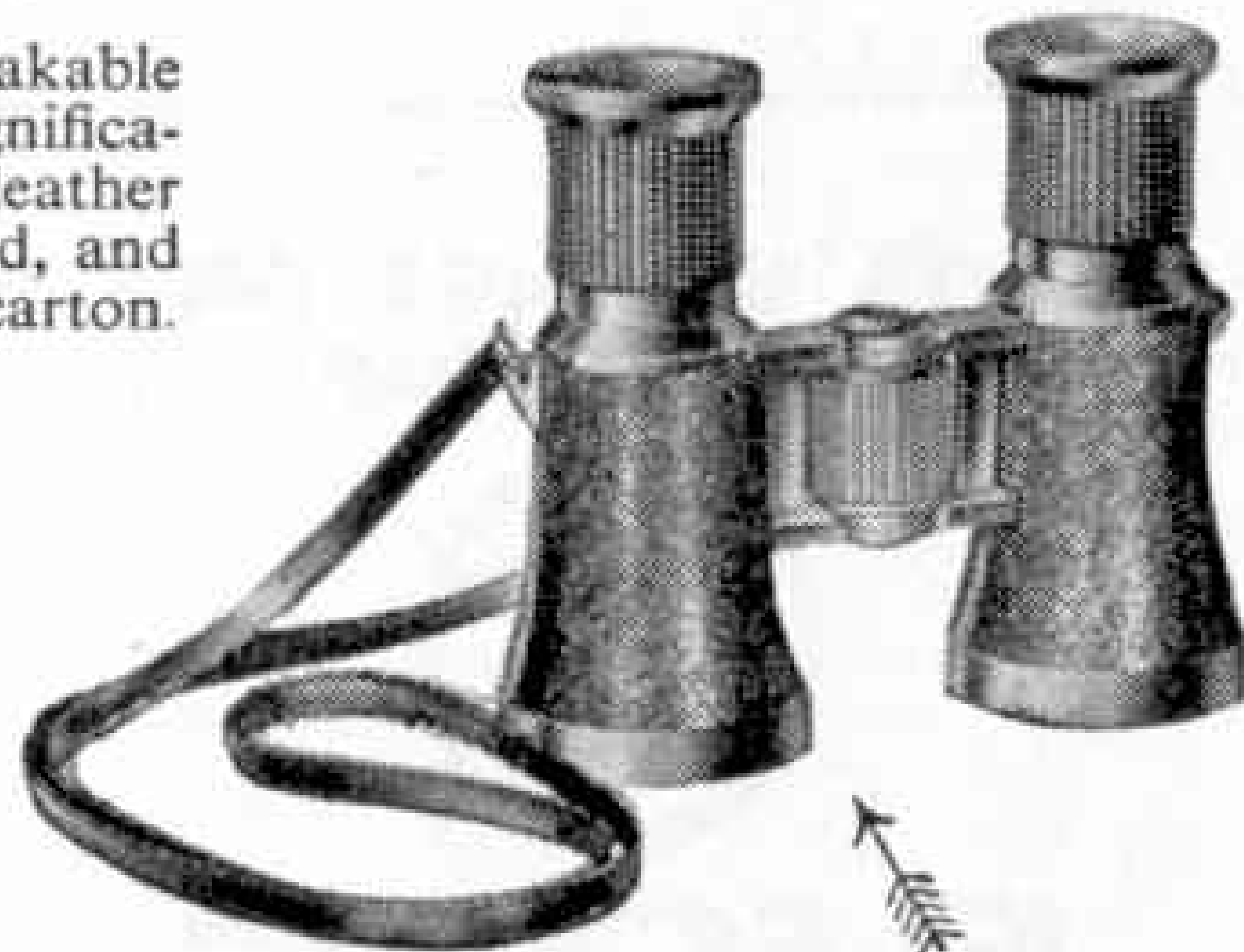


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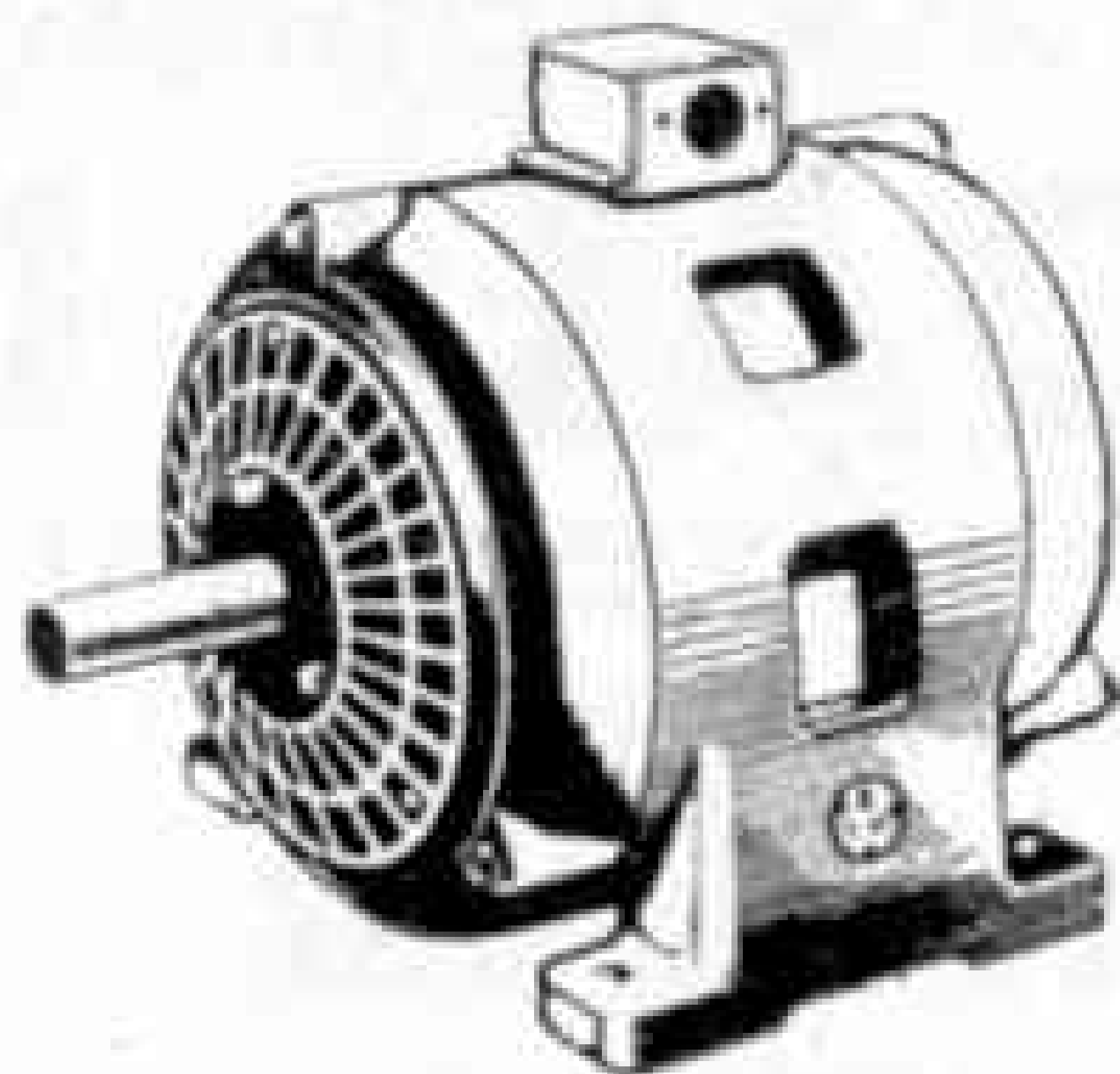


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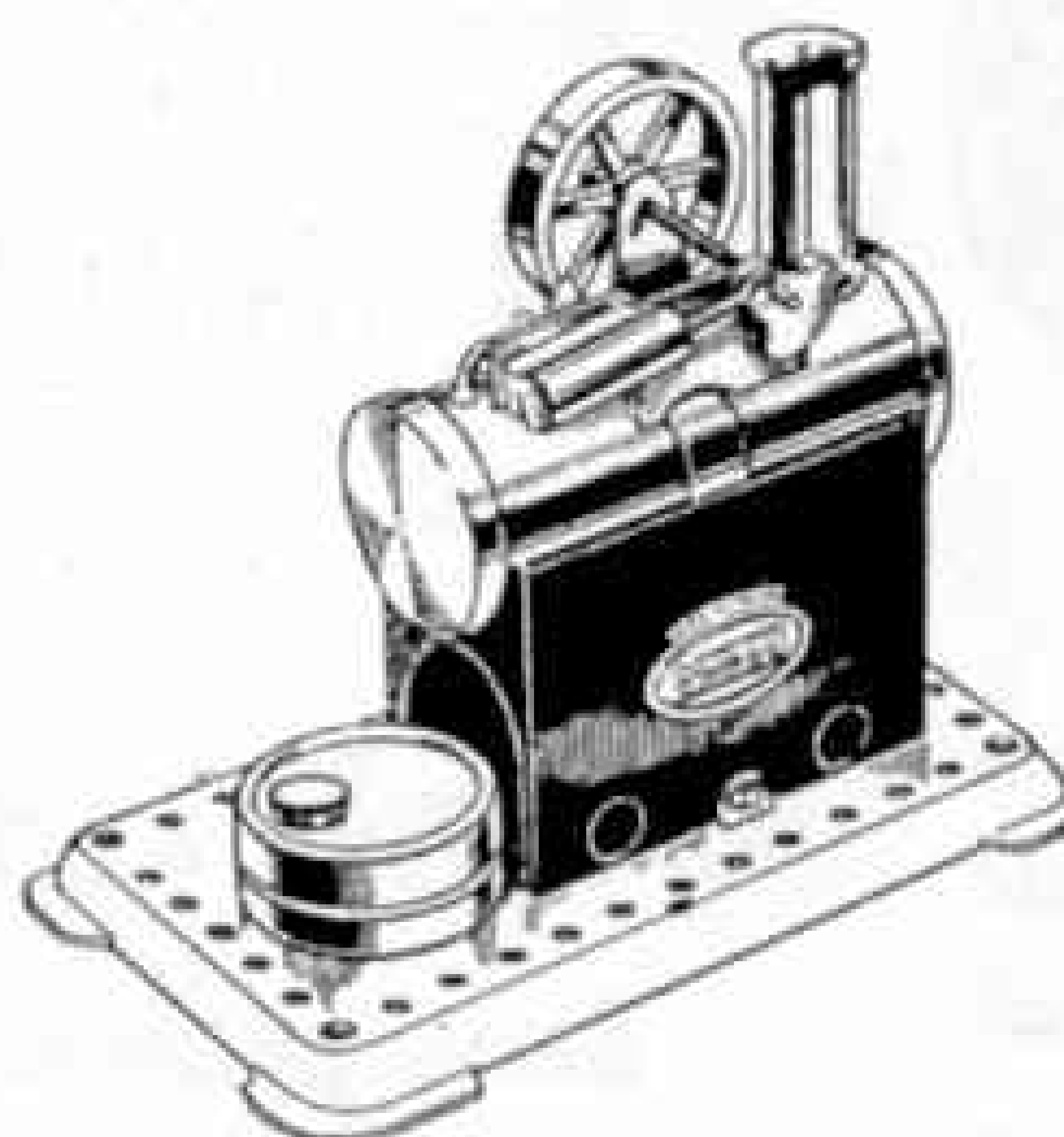
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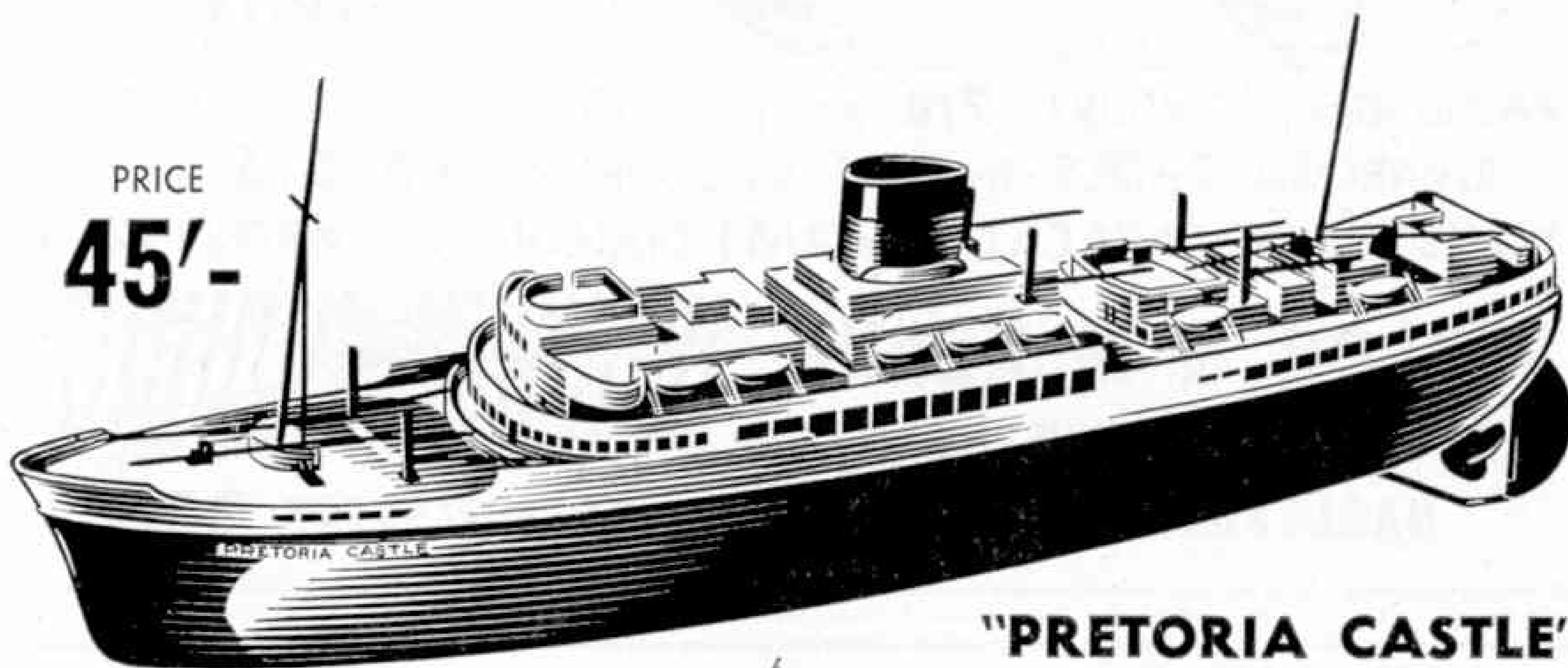
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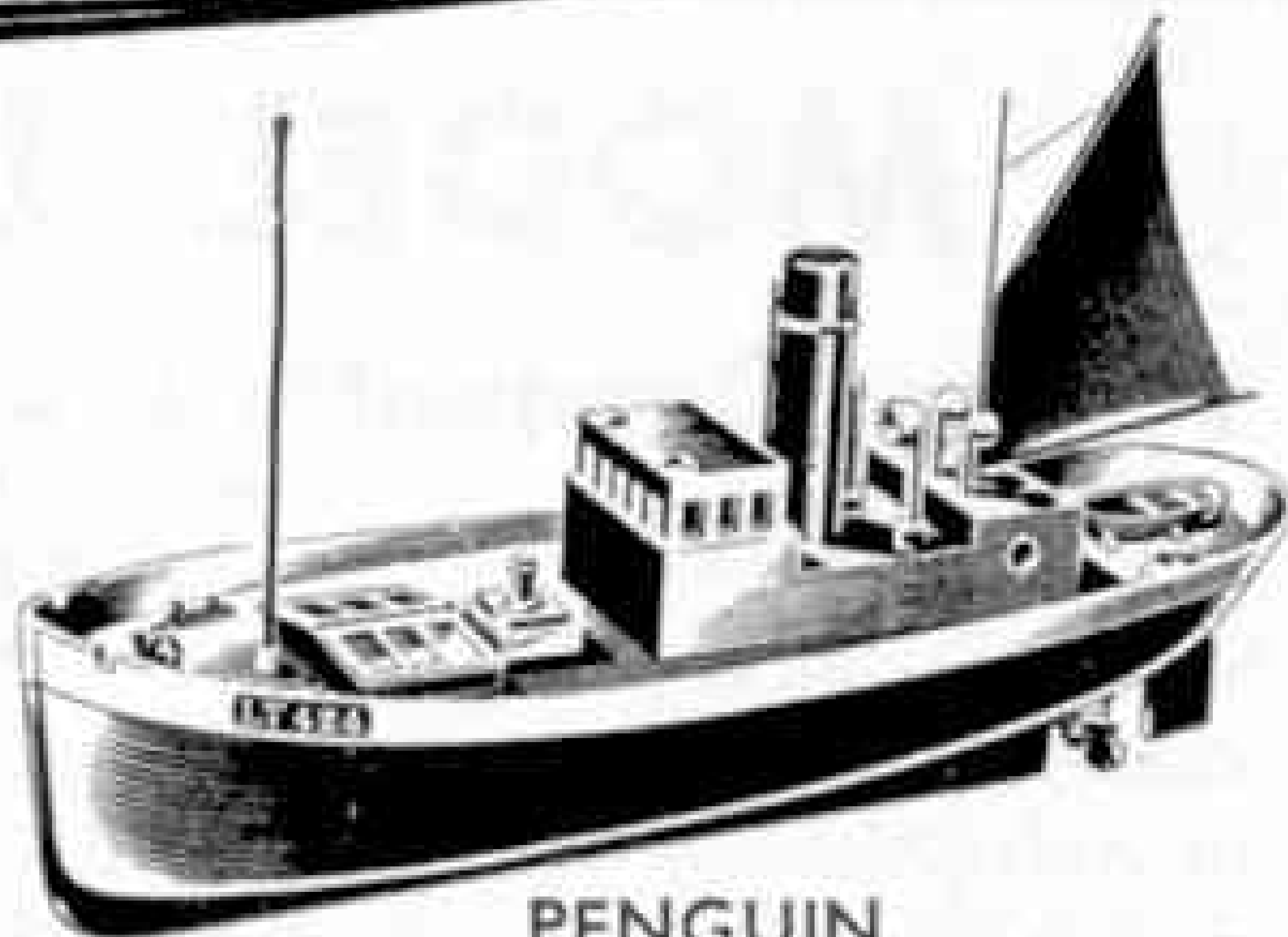
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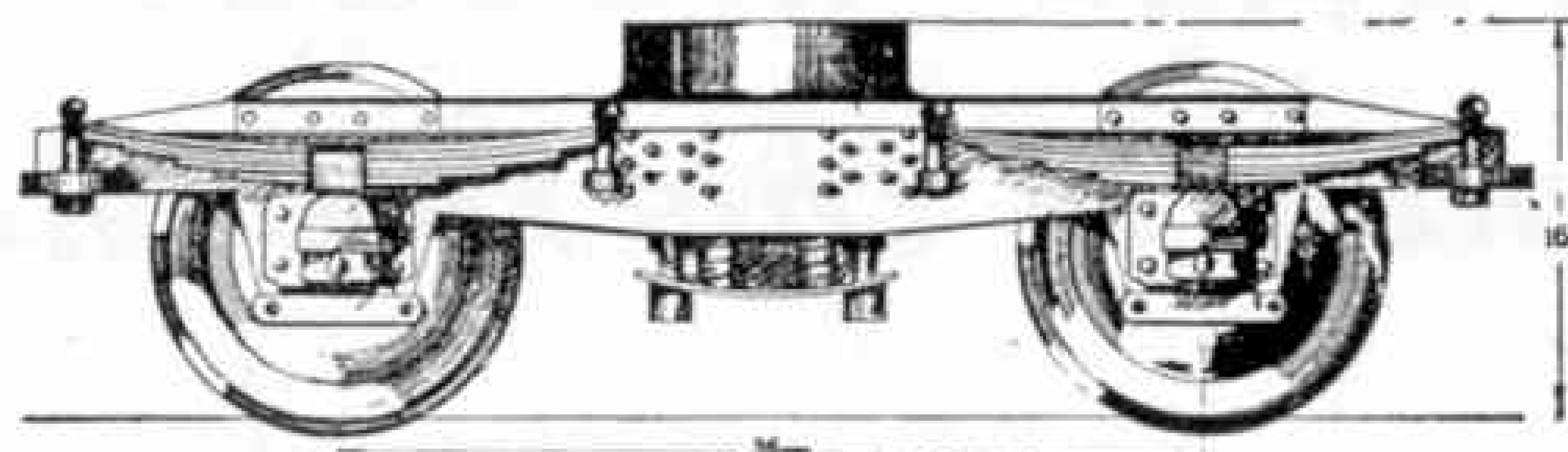


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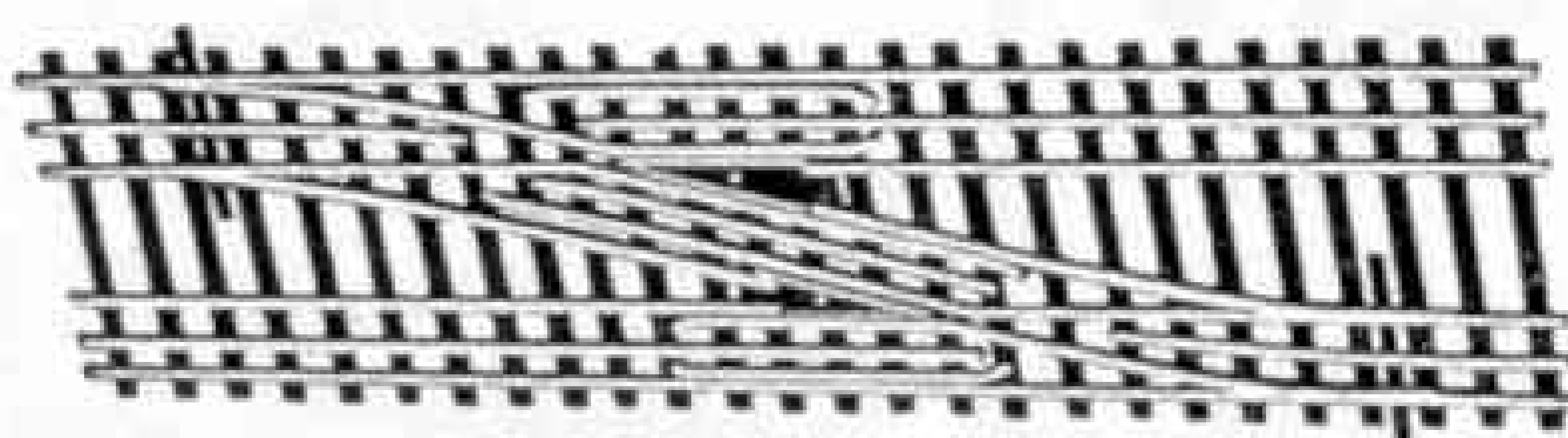


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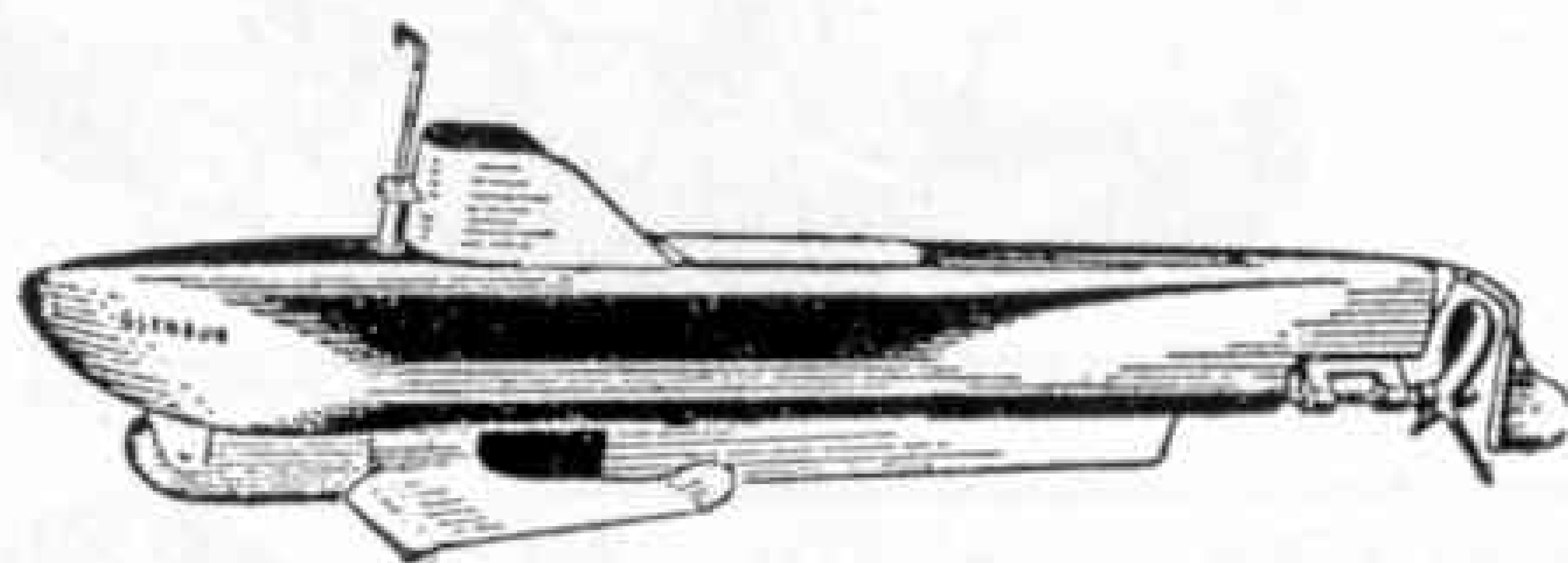
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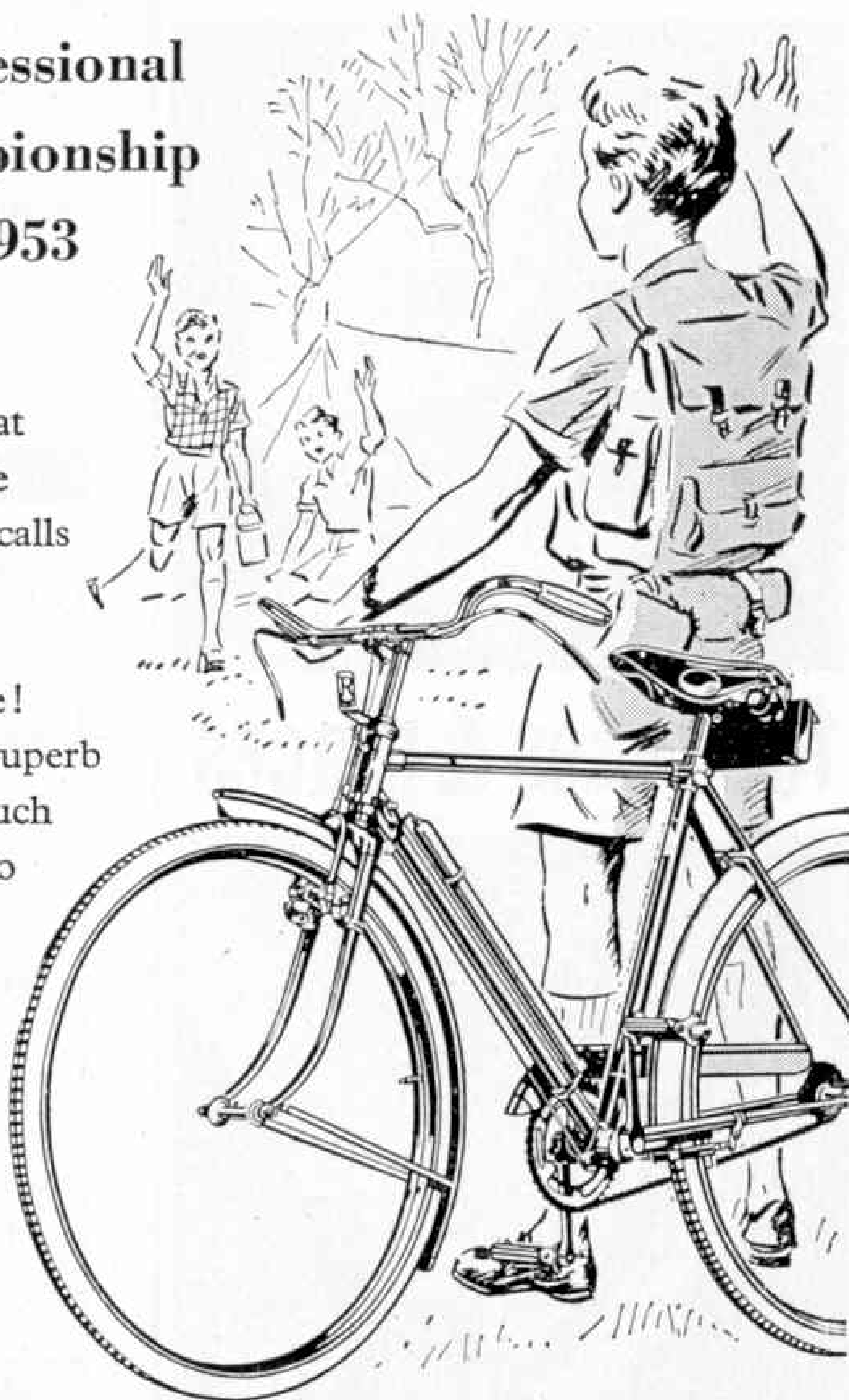
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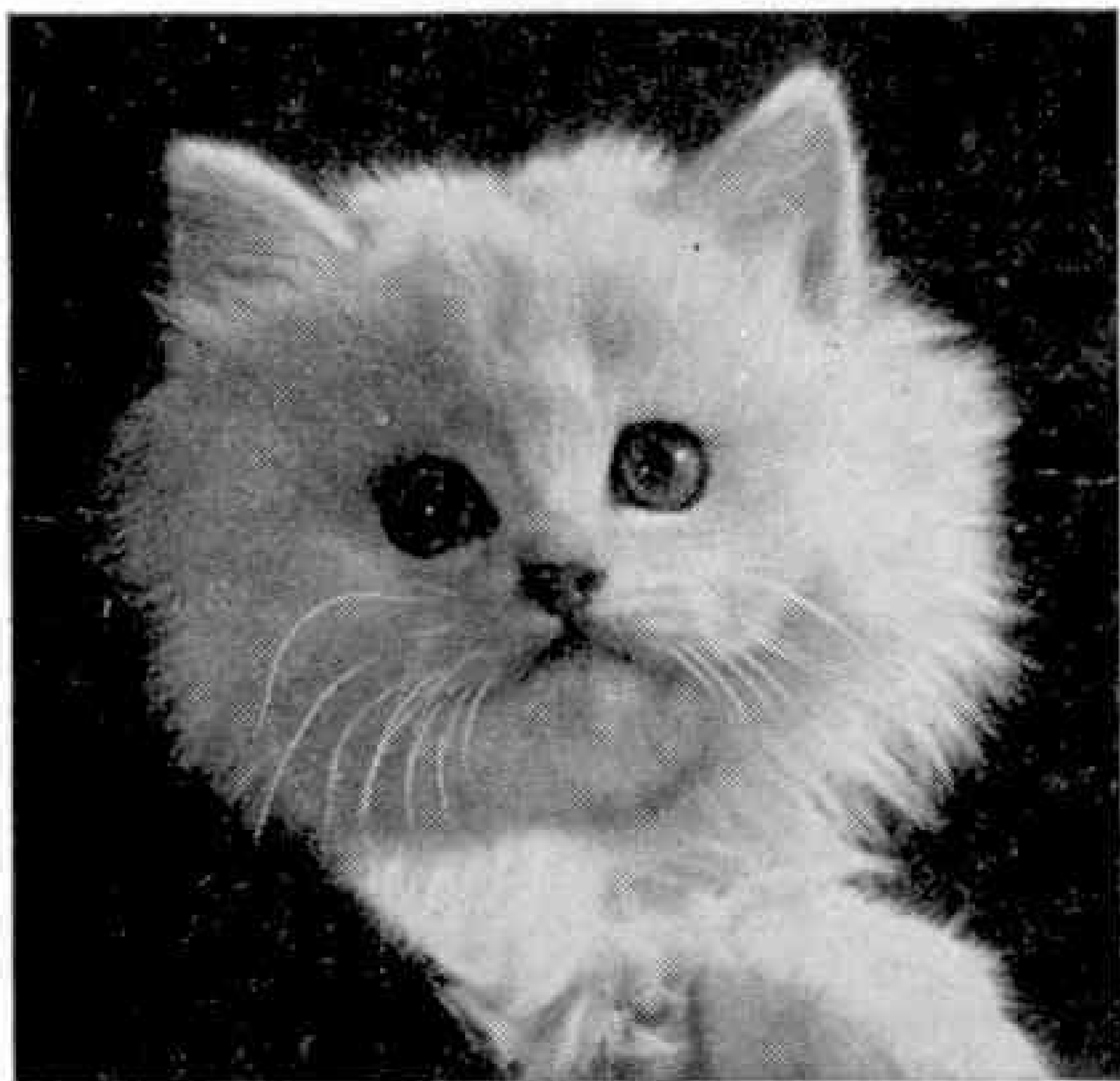


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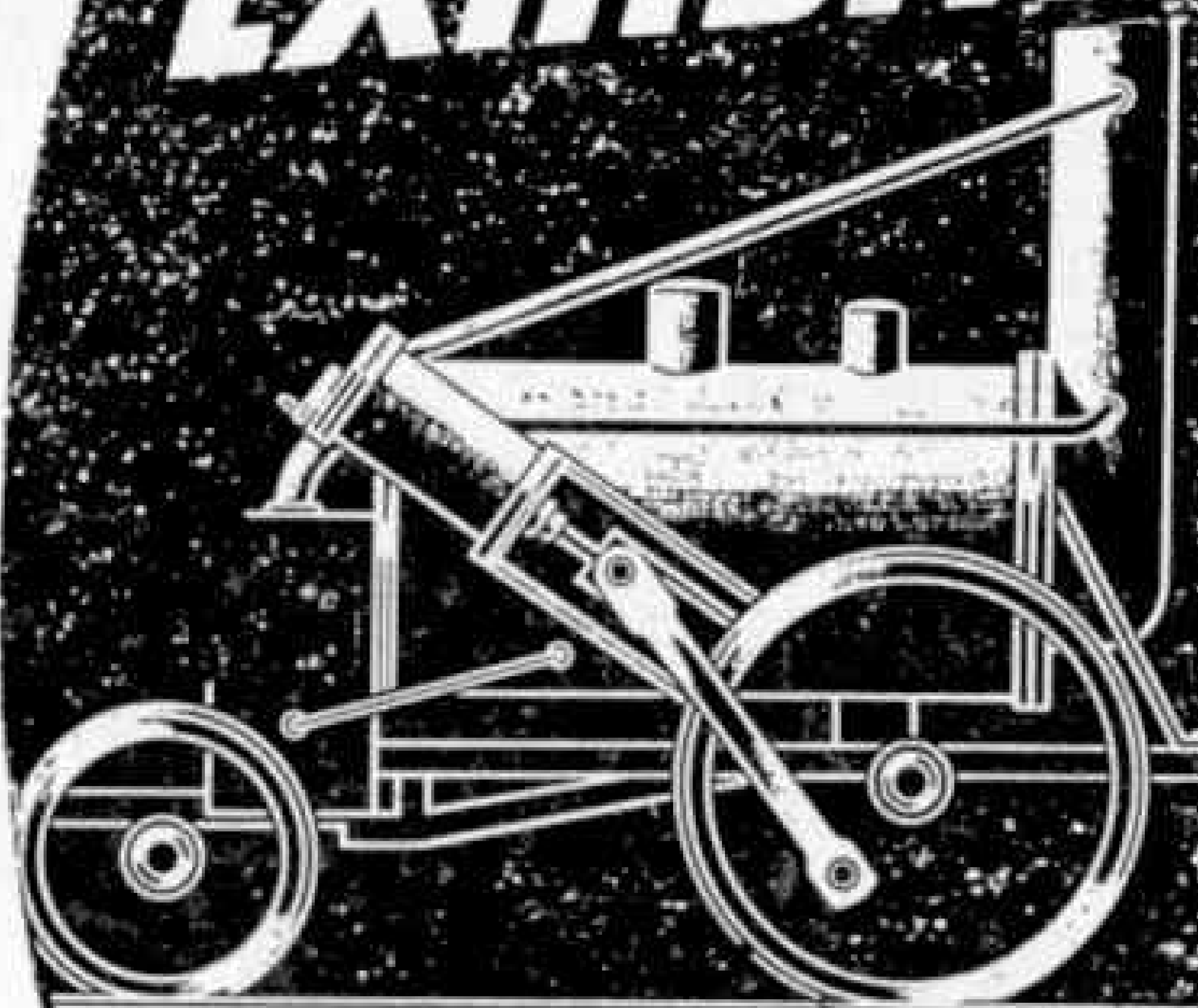
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**AUG 18-28**

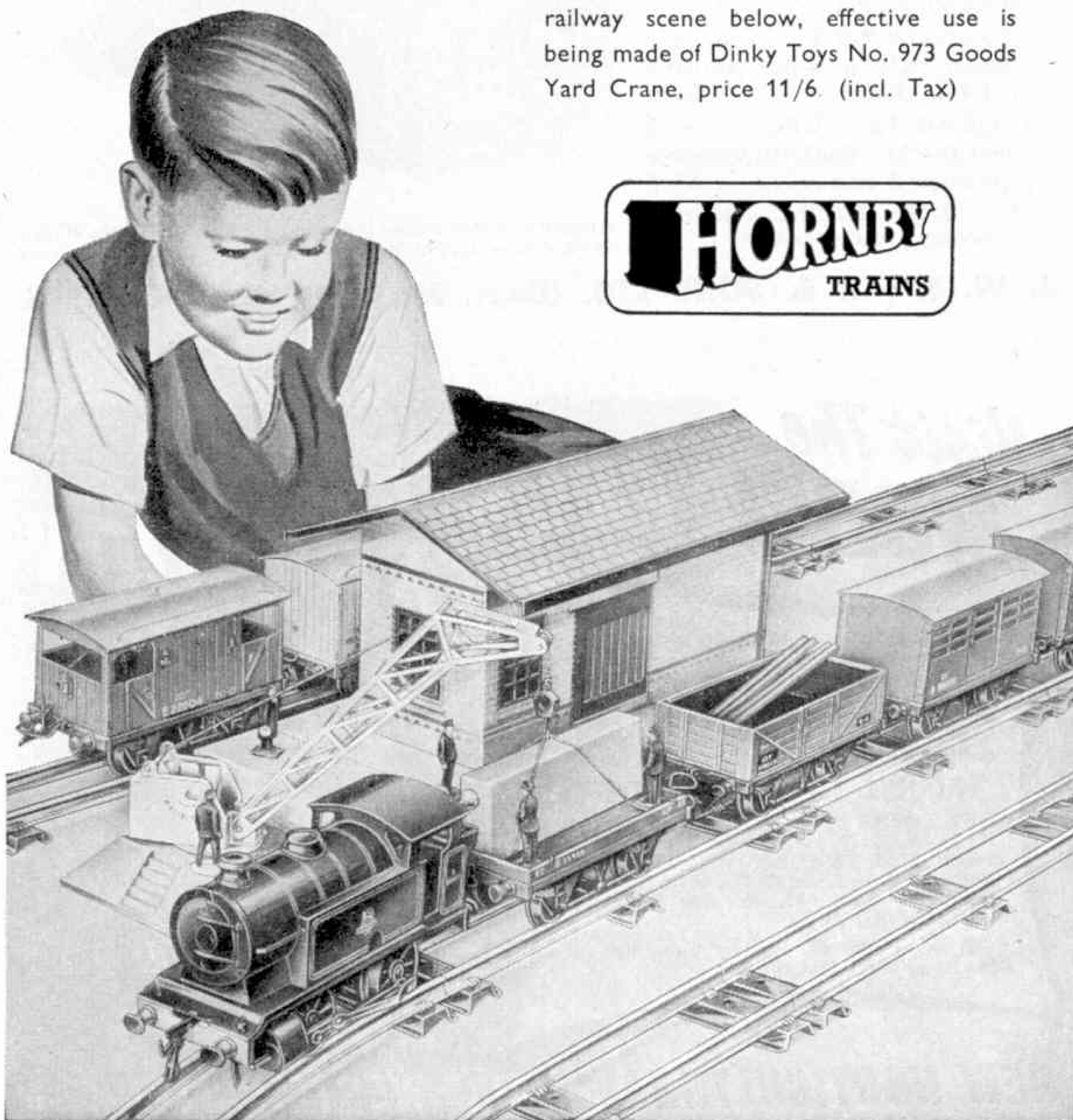
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**HORNBY**  
TRAINS





Next Month: "THE ROAD TO THE ISLES." By H. C. Casserley

# MECCANO

## MAGAZINE

Editorial Office:  
Binns Road  
Liverpool 13  
England

EDITOR : FRANK RILEY, B.Sc.

Vol. XXXIX

No. 8

August 1954

### A Holiday Wish

August, the holiday month, has come round again. I am writing well ahead of Bank Holiday, so I do not know whether you are enjoying sunny skies or not as you read these words. You might be! I hope you are. After all, we had so much rain earlier, particularly in June, the wettest for goodness knows how many years, that one would think there couldn't be much left undelivered.

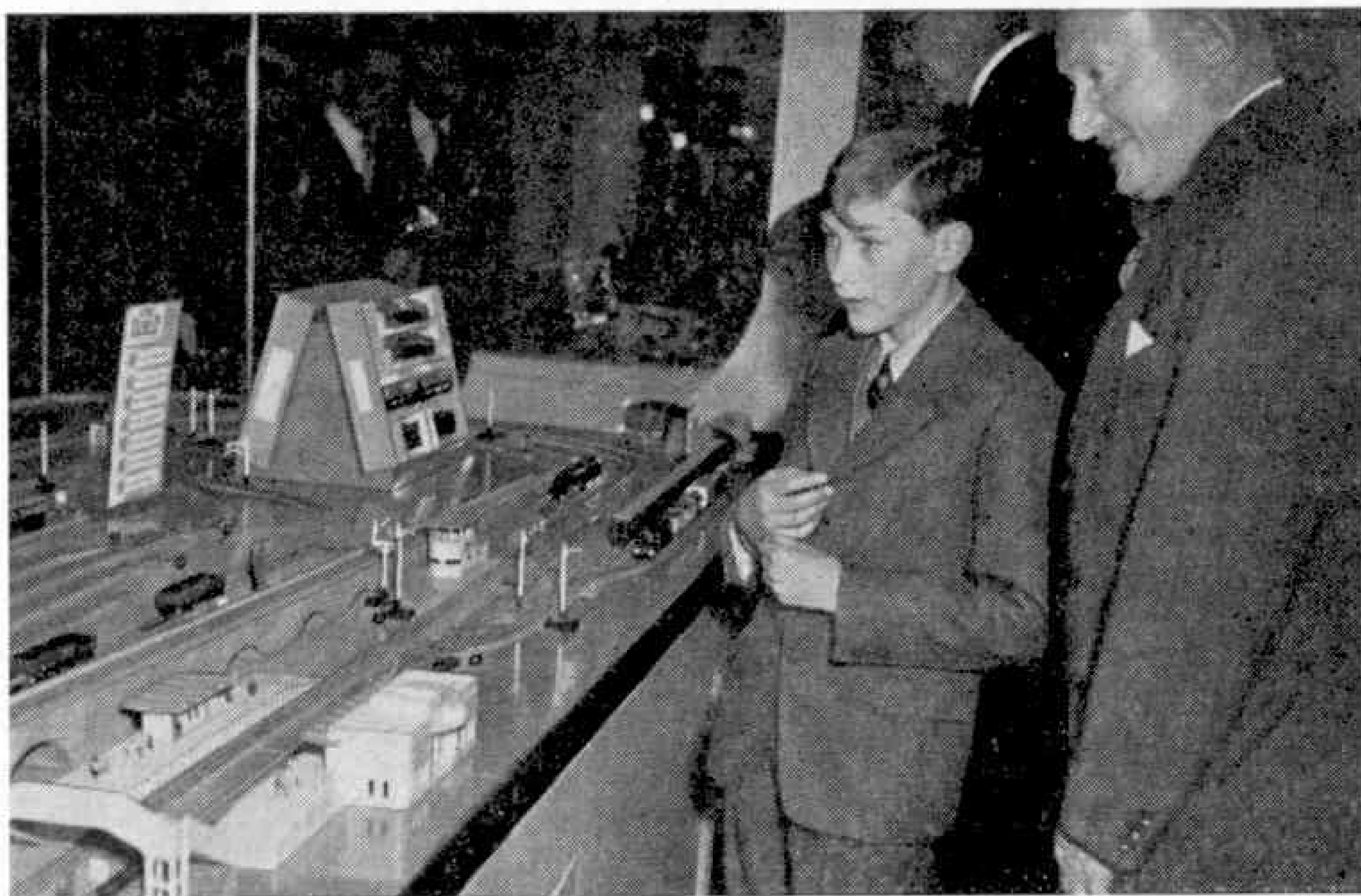
Well, this is the British climate, which is of the kind in which we can have the wettest month and the sunniest month in the same year. Let us hope this happens in 1954 and that our sunniest month this year will be an August holiday achievement.

#### Puffing Billy Again

You will probably all remember the story of *Puffing Billy*, the locomotive of the narrow gauge railway from Ferntree Gully to Gembrook, in Victoria, Australia, as it was only in February last that this remarkable engine and the train it hauled were described and pictured in the *M.M.* Now I learn from an Australian reader

that the line is to be abandoned. The explanation given is that it is a burden on railway finances.

I suppose that when a small line such as this does not pay something has to be done, but it is always sad when such a



H.R.H. Prince William enjoying a discussion on Hornby-Dublo Trains with Mr. R. G. Hornby, Chairman of Meccano Limited, at the British Industries Fair, Olympia, in May last.

gay institution comes to an end. There may eventually be an electric service on a new route, probably a more comfortable one, but that will never have the same fascination as the old train, with passengers on the footboards and the roofs of its coaches, and privileged beings invited to join the enginemen in the cab of *Puffing Billy* himself.

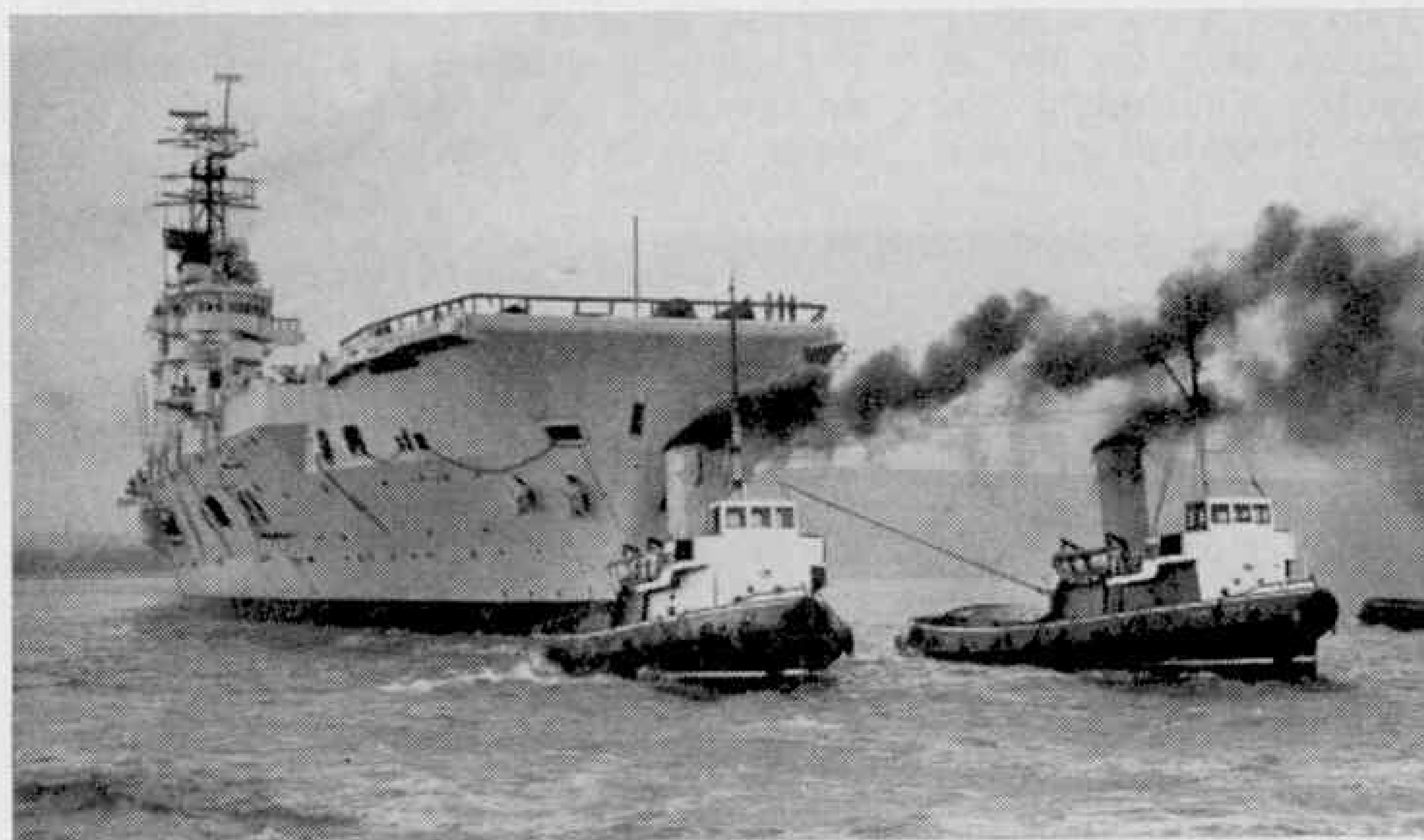
*The Editor*

# Towing a Great Liner

## I Join a Mersey Tug at Work

By the Editor

THE splendid cover of this issue will remind many readers of happy holidays spent on Merseyside, or indeed near any one of our great ports. In the picture the reader is looking from a Wallasey ferry boat on its way back from New Brighton, and the vessel apparently bearing down on him is one of the many tugs always at work in the Mersey and in the docks opening from it.



The tug is *Fighting Cock*, one of a fleet with such names as *Game Cock*, *Storm Cock*, etc., 15 or so of them, owned by the Liverpool Screw Towing and Lighterage Co. When I showed the officers of the company the cover I asked them what their tugs did. They immediately invited me to go and see for myself—which of course is exactly what I had hoped they would do!

So it came about that at 7.30 one morning recently I found myself in the wheelhouse of *Fighting Cock*, the very tug that is to be seen in our cover picture. With two other Cocks she was lying in the Birkenhead Docks, which run inland in a series of gentle curves from the west shore of the Mersey, opposite the Pier Head. They were there to take the 10,500-ton Bibby liner *Cheshire* down the docks and out into the Mersey, and to berth her at the Liverpool Landing Stage, where she would later embark her passengers.

The Birkenhead Docks are crossed by

three bridges (all of the cantilever type) and when I boarded *Fighting Cock* she was lying just below the innermost of these, known generally as the "Penny Bridge", for the simple reason that formerly it was a toll bridge and foot passengers were charged a penny to cross it. Presently the bridge began to move, swinging round on its pivot to leave the way open for the tugs to enter Bidston Dock, the limit of the Birkenhead Dock system.

The *Cheshire* was lying to port as we

*Fighting Cock* and *Game Cock* towing the aircraft carrier *Ark Royal* from the fitting-out basin of Cammell-Laird and Co. Ltd., her builders, to the Gladstone Dock for dry docking. "Daily Herald" photograph.

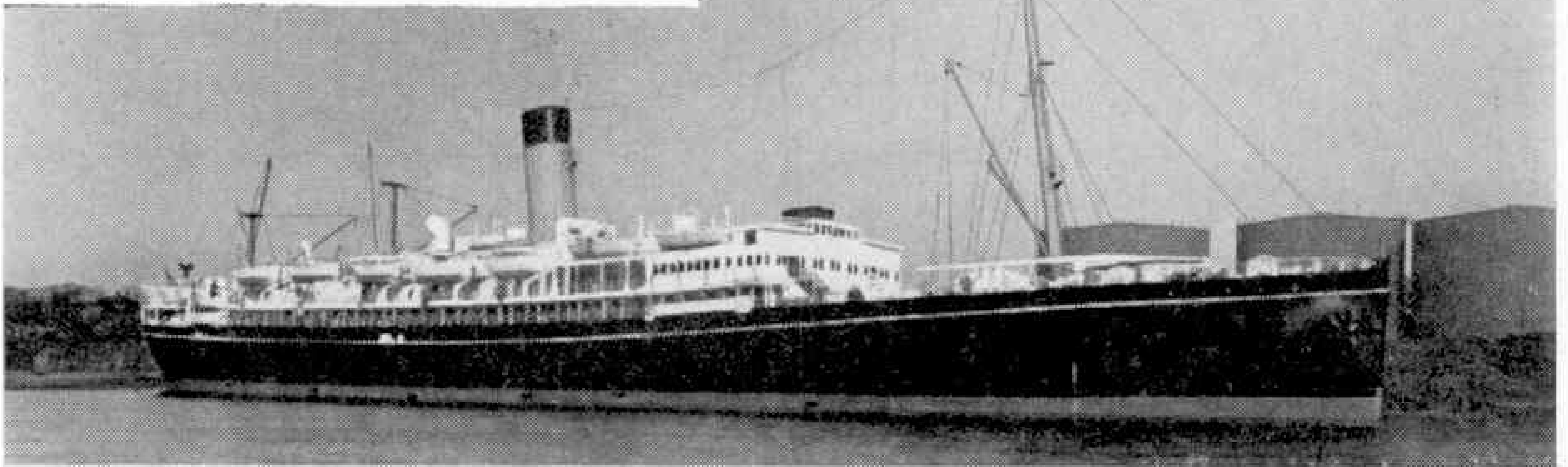
entered the dock, and it was not long before two

tugs had her lined up, one at the bows and the other at the stern. *Fighting Cock* took up post at the bows of the *Cheshire*, which pointed west, that is in the opposite direction from where the Mersey lay. This meant that she would be towed astern all the way down the docks, for there is little room within this system to turn a large ship such as this around.

I had now been joined in the wheelhouse by Captain Wright, *Fighting Cock* so far having been in charge of the Mate. In the meantime the crew had taken aboard the 11 in. hawser hanging from the starboard bow of the *Cheshire*, and had then passed the tug's hawser to the port bow, and had made everything shipshape, ready to help in controlling the *Cheshire* on her way down the docks. As she was to go astern *Fighting Cock* would follow her, also going astern, *Storm Cock* having the actual task of towing the vessel from a position at her stern.



The Bibby Line twin-screw motor vessel "Cheshire". This photograph, reproduced by courtesy of Bibby Bros. and Co., Liverpool, shows the vessel berthed in the West Float, Birkenhead.

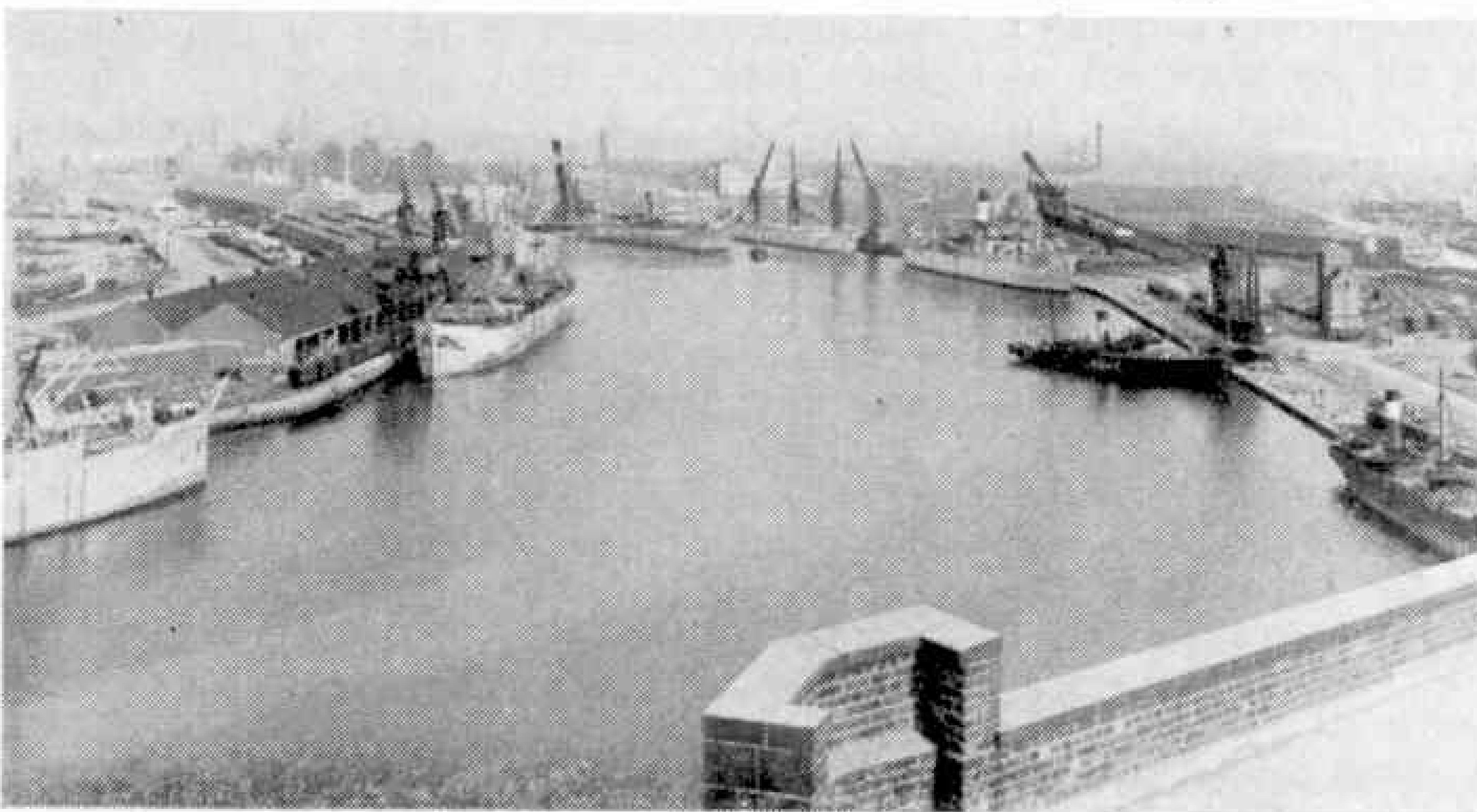


We now had to wait awhile until the bridge, which had closed after the entering tugs, could be opened again, and in the meantime Captain Wright kept *Fighting Cock* in position by occasional touches of the helm and by the use of his engines. At length a blast of the siren came from the *Cheshire*, to be answered immediately by one blast from each of the two tugs, and imperceptibly the latter began to pull outward, to carry the *Cheshire* away from the dockside and into the middle of the dock, in line with the passage between the piers of the bridge. There was no jerk as the hawsers took up the strain, everything proceeding smoothly and easily. The tug at the *Cheshire's* stern eased off into the passage way as the *Cheshire* came forward, and as the great vessel straightened up she was pulled slowly but steadily through, with *Fighting Cock* in the rear.

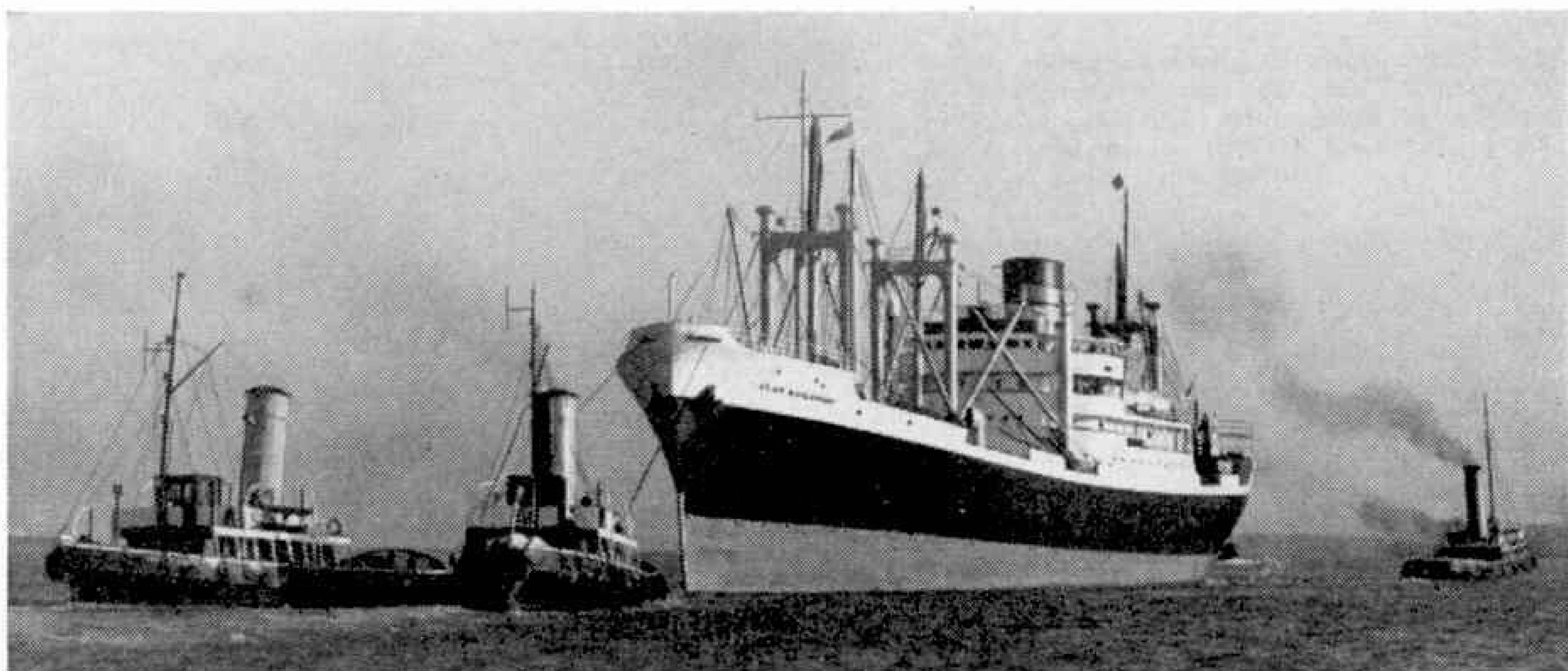
From the wheelhouse I had a splendid view of the operation, for *Fighting Cock* did not remain in line with the vessel, but was now slightly to port and then slightly

to starboard, changing her position as required to correct the swing of the *Cheshire* ahead of her. Seldom have I seen anyone so concentrated on his job as was Captain Wright, and I am sure that the Skipper of the tug ahead was equally alert. Moving from side to side of the wheelhouse, and often stepping outside to the limit of the bridge, Captain Wright kept his eye on his charge and on the tow lines, adjusted the helm, signalled the engine room and constantly lined up the *Cheshire* with landmarks ashore to make sure she followed the right line. His long training and great experience had made all his movements seem instinctive for to me he appeared to make allowances for every slight movement even before it actually began.

After we emerged from the Bidston Dock and the "Penny Bridge" closed behind us, we continued down the large basin known as the West Float. It was then that I noticed our third tug *North Cock*, in attendance to give assistance as it was needed, and saw that she had now taken up position at one side of the *Cheshire* and was actually



The West Float, Birkenhead Docks, which curves down to the Duke Street rolling lift bridge. The deck of this is raised, a large vessel in charge of tugs having just passed through the opening into the basin. Photograph by courtesy of the Mersey Docks and Harbour Board.



nosing her large bow fender against her side.

There was some breeze blowing across the dock from the north side. The effect of the wind on the vast sides of a great liner can be serious if not checked, especially when approaching a narrow passage such as that opening out for us as we approached the Duke Street bridge, the gigantic rolling lift structure that provides the busiest highway across the Birkenhead Docks. The tendency of the *Cheshire* to swing by the stern as the wind took her was checked partly by *Fighting Cock*, which took up position to exert some restraint, and partly by the friendly nudge that *North Cock* was giving her. Between them the tugs got her exactly lined up with the passageway, and she was kept there until she was safely through, with only a few feet on each side, and into the East Float.

In the wheelhouse I was well above the roadway of which the bridge deck normally formed part. Waiting till we were out of the way, and the bridge could again be lowered, were lines of motor cars and lorries, with a bus or two, their drivers and passengers no doubt wishing they had been a few minutes earlier.

Our third tug again came into action as we approached the third bridge, or rather set of bridges, for here there are two close together, crossing separate exits from the East Float. When these were open we passed through one of the openings easily and safely, and thus we approached the end of the first stage of our journey—the lock communicating with the Mersey.

It was here that I particularly noticed

Clan MacLennan in charge of three Cock tugs, two ahead and one astern. The latter is not "pulling a different way", as she appears to be, but providing control at the liner's stern.

the antics of the gig-boat men. A gig-boat is a small vessel, about the size of a one-pair oar rowing boat and looking very frail, that is fitted with a small motor engine and carries a crew of two, one man to steer and control the engine and the other to handle ropes. Ropes indeed are the main concern of the gig-boat men. The little craft spluttered out from the quay side as we approached the lock, came much nearer to the bows of the *Cheshire* than I should have liked to have been in such a tiny boat, and took on board a mooring rope lowered from the ship. This was deftly secured in very short time, and the gig-boat then

turned and ran for shore, pulling out the shore line after it. A line was then thrown up to the dockside and the shore line from the *Cheshire* was hauled up and slipped round a bollard.

Gig-boat men had been at work as the *Cheshire* came through the earlier passages, for with a line ashore and passing round her winches, a vessel is able to help herself edge into the right position.

Once in the lock the *Cheshire* had to stay there for an hour or more, until the rise of the tide and the lowering of the water in the lock and the basin behind it had brought the two to the same level. When finally settled she made a siren signal—one long and one short repeated.

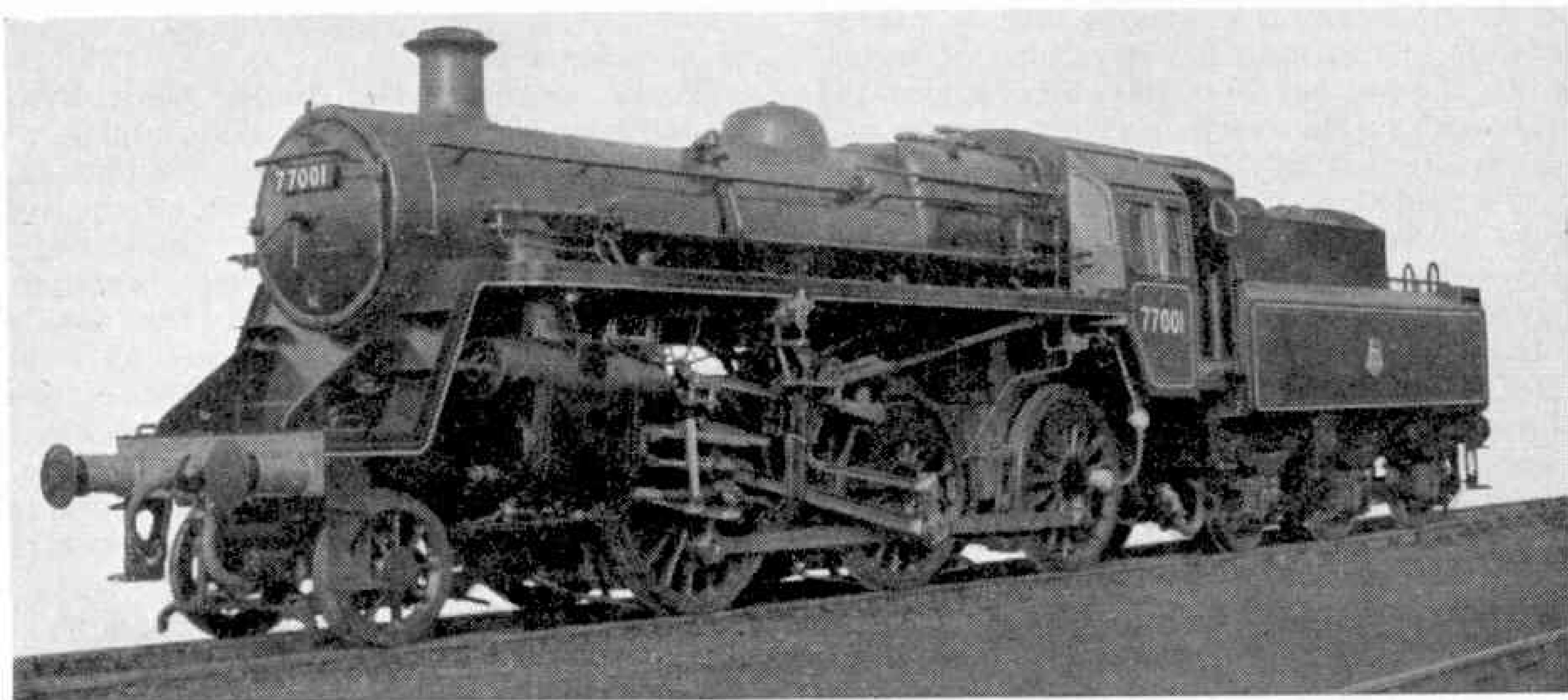
"There goes the Birkenhead War Cry," remarked Captain Wright.

"What on earth's that?" I asked.

"Oh, that's what we call this signal. Actually it means 'Hold on where you are', and we look like being here for some time. Come down below with me".

(To be continued next month)





**Y**ET another variation of the 2-6-0 locomotive has been added to B.R. stock by the appearance from Swindon Works of the first of a series of 20 locomotives of this type. One of them is shown in the British Railways official photograph reproduced above. These new engines belong to power class 3, and form a useful intermediate standard between the 2-6-0 lightweights of class 2 and the heavier class 4 engines of the same wheel arrangement already in service.

The ultimate aim of the design has been to provide a modern standard engine, simple and robust, to replace the varying tender engines of similar power classification that are now becoming obsolete. The 6-coupled wheels ensure sufficient adhesion, while the leading pony truck assists in weight distribution and helps the curving properties of the engine.

Although the parent office for the design was Swindon, the preparation of certain details was undertaken at Brighton, Derby and Doncaster, in accordance with the B.R. practice of sharing out such work between various locomotive establishments.

It will be recalled that the class 3 2-6-2 tanks that appeared last year were Swindon built, and the engines now described can be considered as a tender version of the same design. The tractive effort is the same for both series of engines and, like the tank type, the new tender engines are able to run almost everywhere

over main and secondary lines throughout Britain. The axle loading is low, and the dimensions generally contribute to this wide availability.

Outside cylinders and motion are provided and, as with other B.R. standard designs, the whole engine has been planned with a view to ease of handling and maintenance. This accounts for the highly raised running plates, which on these comparatively short engines look really

high. They do of course make attention to "on-top" details more easy, while servicing "below deck" can be more

readily performed. Adequate staying of the main frames, both horizontally and vertically, has had special attention, and a rocking grate, a self-emptying ashpan and a self-cleaning smoke-box all help to cut disposal time. The boiler itself is identical with that provided on the corresponding 2-6-2 tanks. It follows closely the design of the former G.W.R. standard No. 2 boiler used on the "51XX" "81XX" and "56XX" classes. Actually the steel and copper flanged plates for the fire-box are common to both designs.

Footplate arrangements follow recent B.R. standards. The angled cab spectacle plates give a good range of vision ahead, while the set-in bunker of the tender and its low tank give a good rearward view through the tender spectacle plate. The tender itself is similar to the pattern used for standard 4-6-2s and the class 5 4-6-0s, but is smaller. It is known as the

## New B.R. Engines

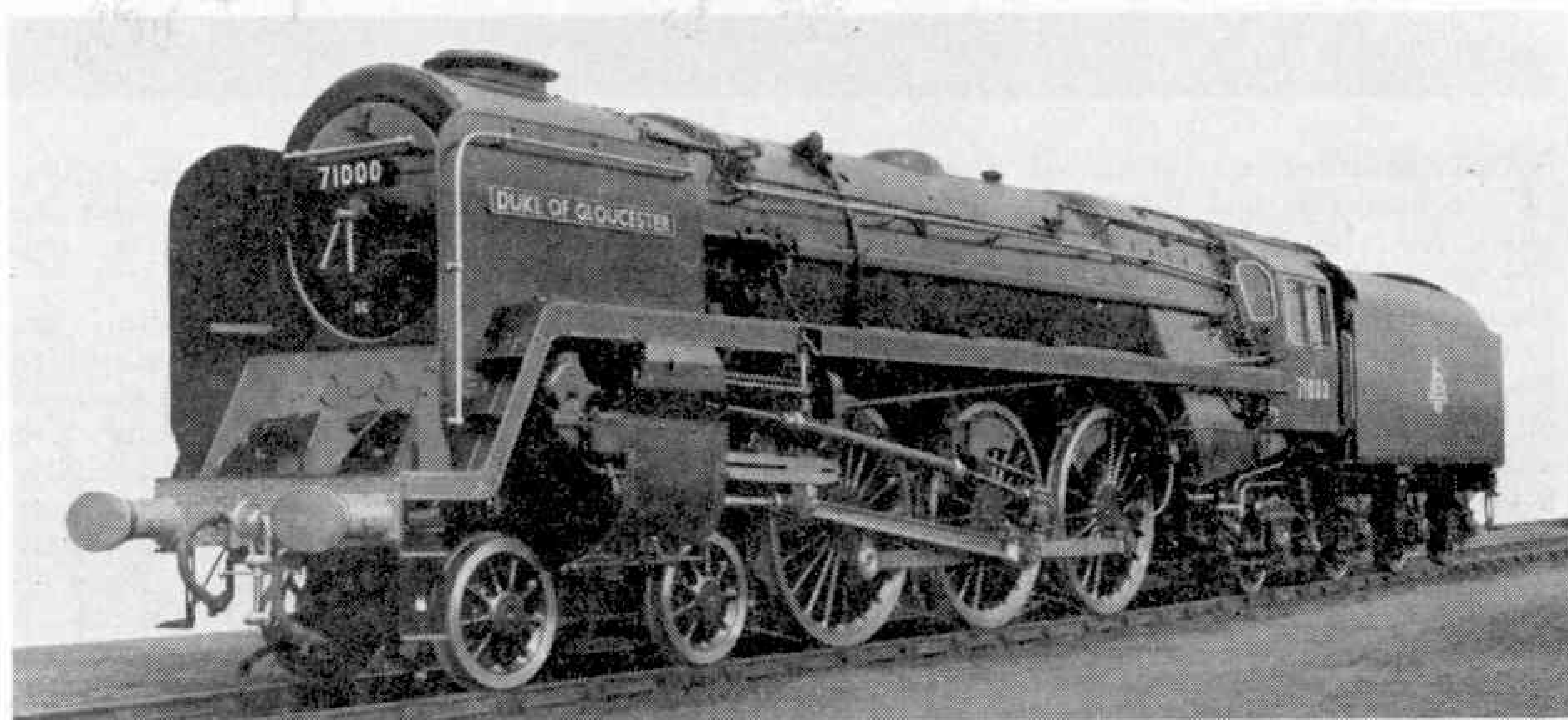
B.R. Standard 2A Tender and it carries 6 tons of coal and 3,500 gallons of water.

Of the present 20 engines 10 are intended for work in the North Eastern Region and 10 in the Scottish Region.

In addition to this 2-6-0 design, the first B.R. Standard steam locomotive intended for heavy express passenger service recently made its appearance, as already reported in *Railway Notes*. This is No. 71000 *Duke of Gloucester*, so named in honour of H.R.H. the Duke of Gloucester, who acted as Honorary President of the recent International Railway Congress held in Great Britain in May last. After the

somewhat of the Peppercorn A1 Pacifics of Doncaster build.

There seems little doubt that B.R. locomotive designers are determined to give their creations a sound foundation, for the main frames of the new engine are formed of steel plates  $1\frac{1}{4}$  in. thick, very strongly braced and stayed together. The drive is divided, with the inside cylinder connected to the crank axle on which the leading driving wheels are mounted. So the inside cylinder casting, which has the smoke-box saddle integral with it, is set ahead of the two outside cylinders, which drive on the centre



various series of two-cylinder locomotives of mixed traffic types that began three years ago with the well-known *Britannia* 4-6-2, it is interesting to note that *Duke of Gloucester* incorporates three-cylinder drive and, unlike the previous B.R. Standards, has British Caprotti valve gear, incorporating poppet valves.

In its general externals this Crewe-built engine follows broadly the lines made familiar by the *Britannia* 4-6-2s, with its long tapered boiler, a wide, Belpaire-type fire-box, and high foot-framing carried well above the cylinders and coupled wheels. At the front the same long smoke-box is there, flanked by the bold smoke deflectors, but in place of the single chimney carried by *Britannia* and her sisters, *Duke of Gloucester* has a double chimney. This is placed fairly well forward on the smoke-box and the general set-up at the front end reminds one

coupled wheels. Roller-bearing axle-boxes are used throughout.

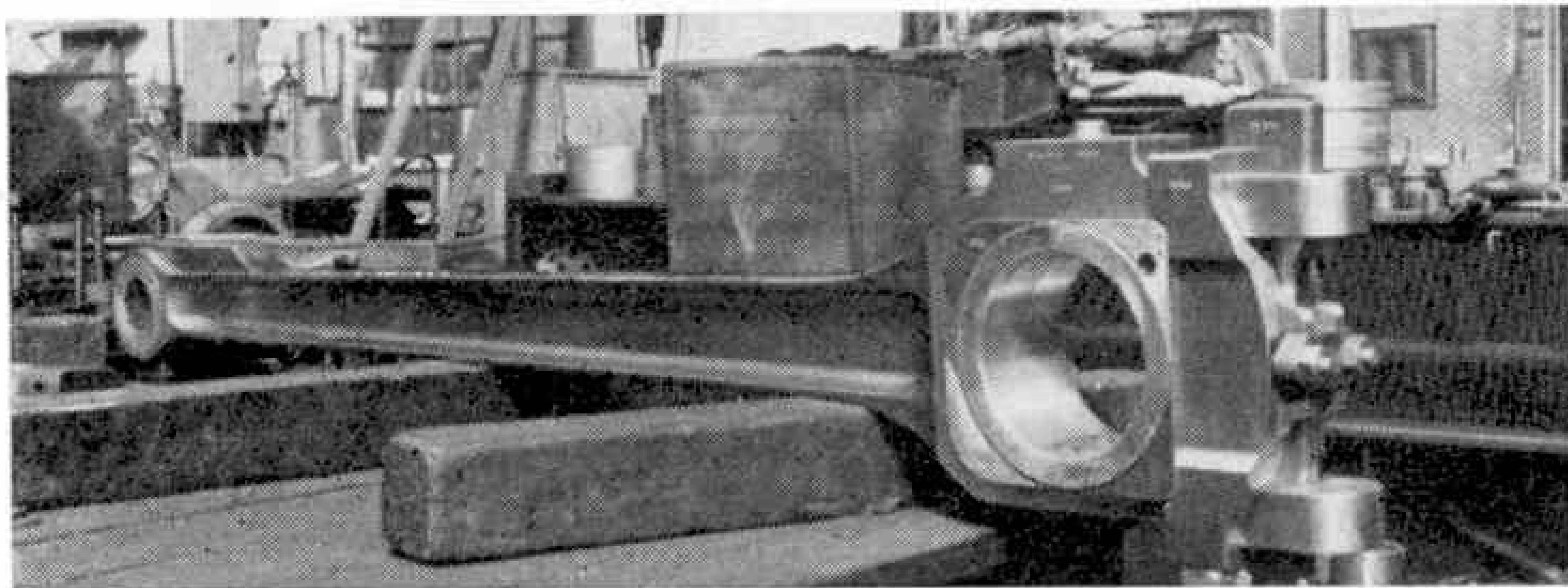
The inside connecting rod big end, a component not always wholly reliable in some three-cylinder designs, has evidently been the subject of special development, and a feature that is new in B.R. practice is seen in the method of locking the cotter

that secures the big-end brass and strap. A special locking plate carries serrations on both sides. Four different positions are provided for these,

which fit in with corresponding serrations on the back end of the cotter itself. By this means the position of the cotter can be adjusted, and with it that of the big-end brass as required to take up wear. An adjustment of  $\frac{1}{32}$  in. in the cotter position results in a final adjustment of approximately .002 in. on the big-end brass, which of course is split to permit it to be fitted to the inside crankpin.

Above is *Duke of Gloucester*, B.R. No. 71000, the first B.R. Standard 4-6-2 for heavy express passenger traffic. British Railways Official Photographs.





The inside connecting rod of No. 71000 showing the robust nature of the big-end arrangements, including the serrated cotter referred to in this article.

The coupled wheels are 6 ft. 2 in. in diameter, as on previous B.R. Standard Pacifics. Steam sanding is fitted to the front of each of them, and to the rear of the intermediate pair. Except for the spiral springs of the trailing truck, the engine and tender springs are laminated and the spring gear allows wheel sets to be removed complete with springs and hangers.

The boiler is similar to that fitted to the Britannias, but the fire-box is 1 ft. longer. The regulator is incorporated in the superheater header in the smoke-box. The regulator valves can be reached for attention by means of a detachable cover on the smoke-box top. Connection to the regulator handle in the cab is by means of the now familiar external rodding.

The smoke-box itself is of the self-cleaning type and the fire-box has a wide grate extending out over the rear of the main frame and trailing truck. The grate is of the rocking type, consisting of 14 rocking sections, seven on each side of the centre line. The two sides can be rocked separately from the footplate.

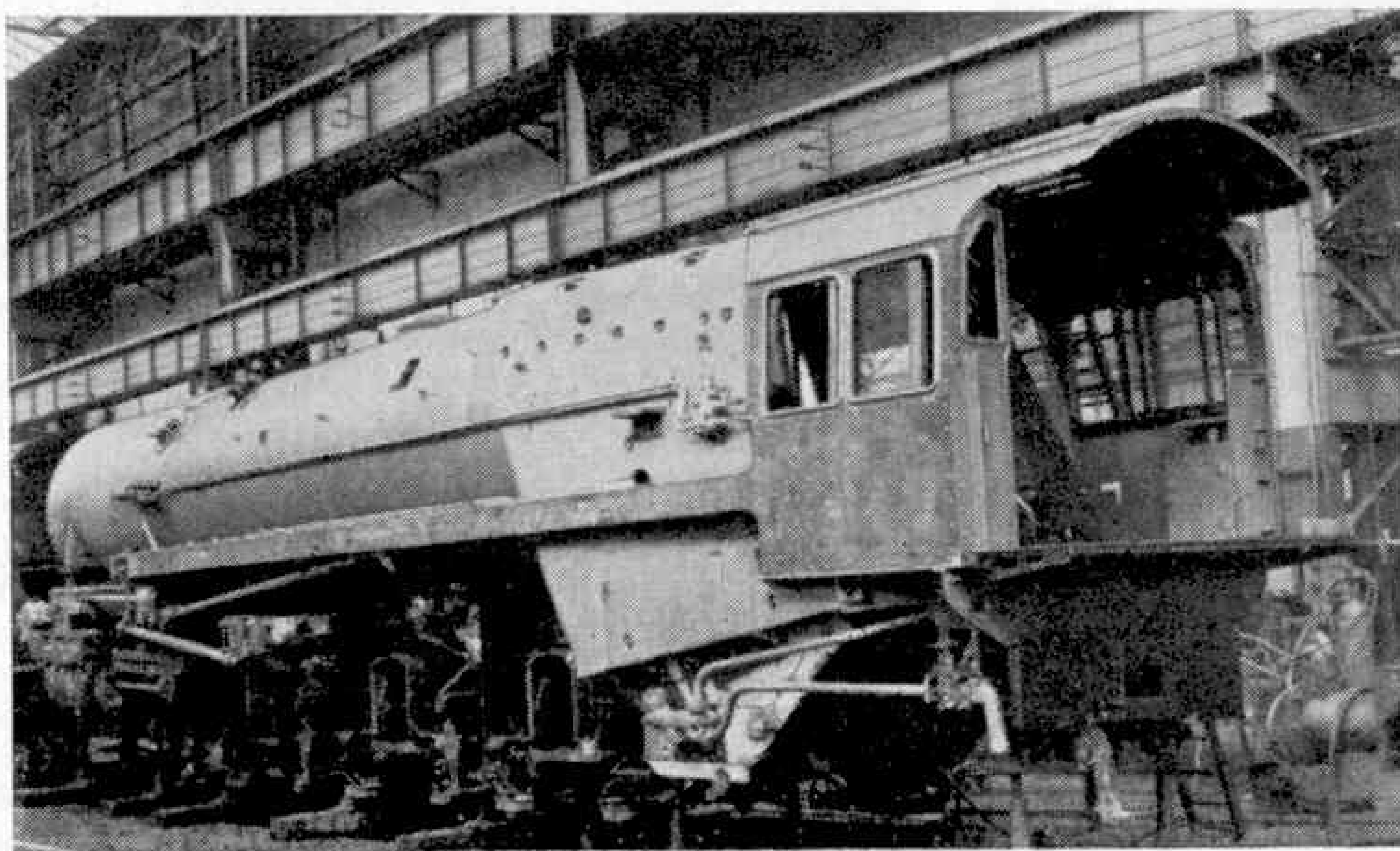
The operating gear is so arranged that its full travel provides for the dropping of the fire when the engine is over an ashpit, and there is a

order to eliminate ash, and to break up clinker. The ashpan has three hoppers, one inside the frames and the others outside, and these have bottom flap doors connected by a shaft that can be operated by a lever from ground level.

The cab arrangements follow the usual B.R. standards, the respective controls being grouped to allow the crew to reach them and to work them easily. The front cab windows, set in the angled spectacle plate, are hinged. Draught screens are provided behind each man's seat, that on the driver's side being extended to the cab roof and having a window, as clearly shown in the illustration of the engine under construction.

Fittingly for the engine, the six-wheeled tender is a big one, holding 10 tons of coal and 4,725 gallons of water. The bunker is not set in above the tank, as on previous B.R. standard tenders. The axles run in roller-bearing boxes. A steam-operated coal pusher helps in trimming the coal, and intermediate buffers keep the engine and tender steady when coupled together.

No. 71000 takes shape at Crewe. Many details are visible in this view, including the main frames and hornblocks, and the rear end with the draught screen behind the driver's seat.



# Time Told by the Sun

## The Story of the Sundial

By A. Holt

WE do not know how men divided their days in the earliest stages of civilisation, but we do know that the more civilised he became, the more essential it was for him to divide his day fairly accurately.

The Egyptians had a kind of sundial. An Egyptian form of shadow clock dating from 1,000 to 800 B.C. is in a German museum. There is mention in the Bible, in Isaiah, Chapter 18, verse 8, of a dial that may have been Babylonian in origin. These and other early sundials had considerable errors.

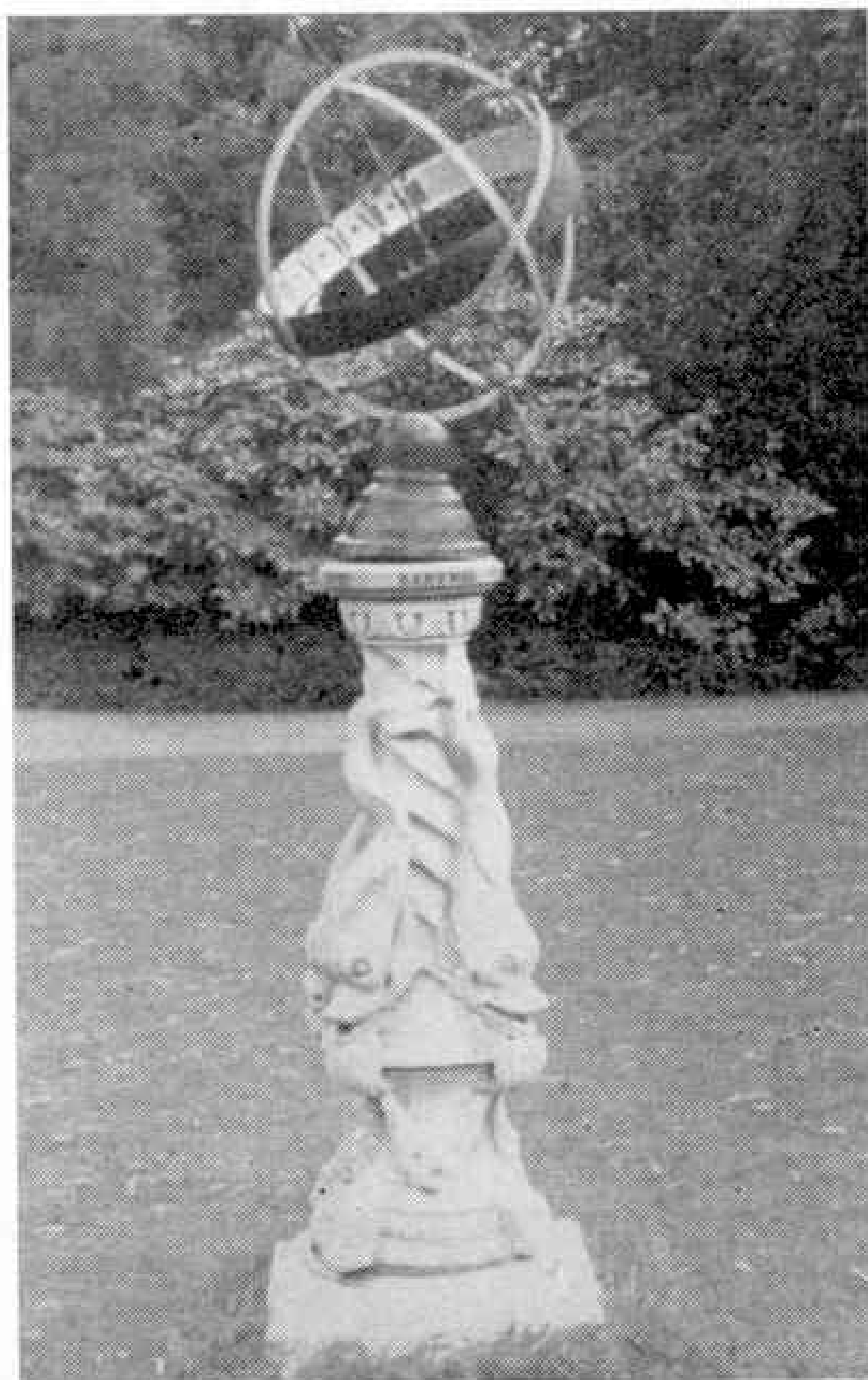
About 300 B.C. the Chaldaean astronomer Berosus built a sundial which, for that period, was quite a unique invention. This was in the form of a hollow hemisphere, in the centre of which he erected a vertical upright. Providing that the hemisphere's rim was horizontal, the shadow of the upright would fall on the inside and the path of the shadow would form a circular arc. Marking this path and dividing it into twelve equal divisions produced twelve equal periods of time for the day. These divisions or periods of time are known as Temporary Hours, due to the fact that the length of daylight for each day varies.

This type of sundial was in use for over 1,000 years, with Greeks and Romans copying its principles. They improved upon its construction in many ways, producing complicated sundials that could also be used for astronomical purposes, and one Roman writer, Vitruvius, described thirteen types of sundial.

Sundials remained in use up to the

eighteenth century, although clocks had been invented 400 years previously. During the eighteenth century, however, the clock began to supersede the sundial, particularly in towns; and with the advent of the clock, Temporary Hours were replaced by Equal Hours, thus ensuring accurate time both for daylight and darkness as we know it today.

Naturally, the clocks and watches of that period hadn't the perfection of the present day, and watches were much heavier and bulkier, besides being costly. But gradually the sundials disappeared from the towns, remaining in use only in country villages. Sundials had always been erected in commanding positions; either in the centre of the market place—usually on some form of pillar or shelter—or else on the church steeple. When the clock reached the villages, like the sundial it was erected where it could easily be seen, again on the church steeple; and today it is quite a common sight in some villages

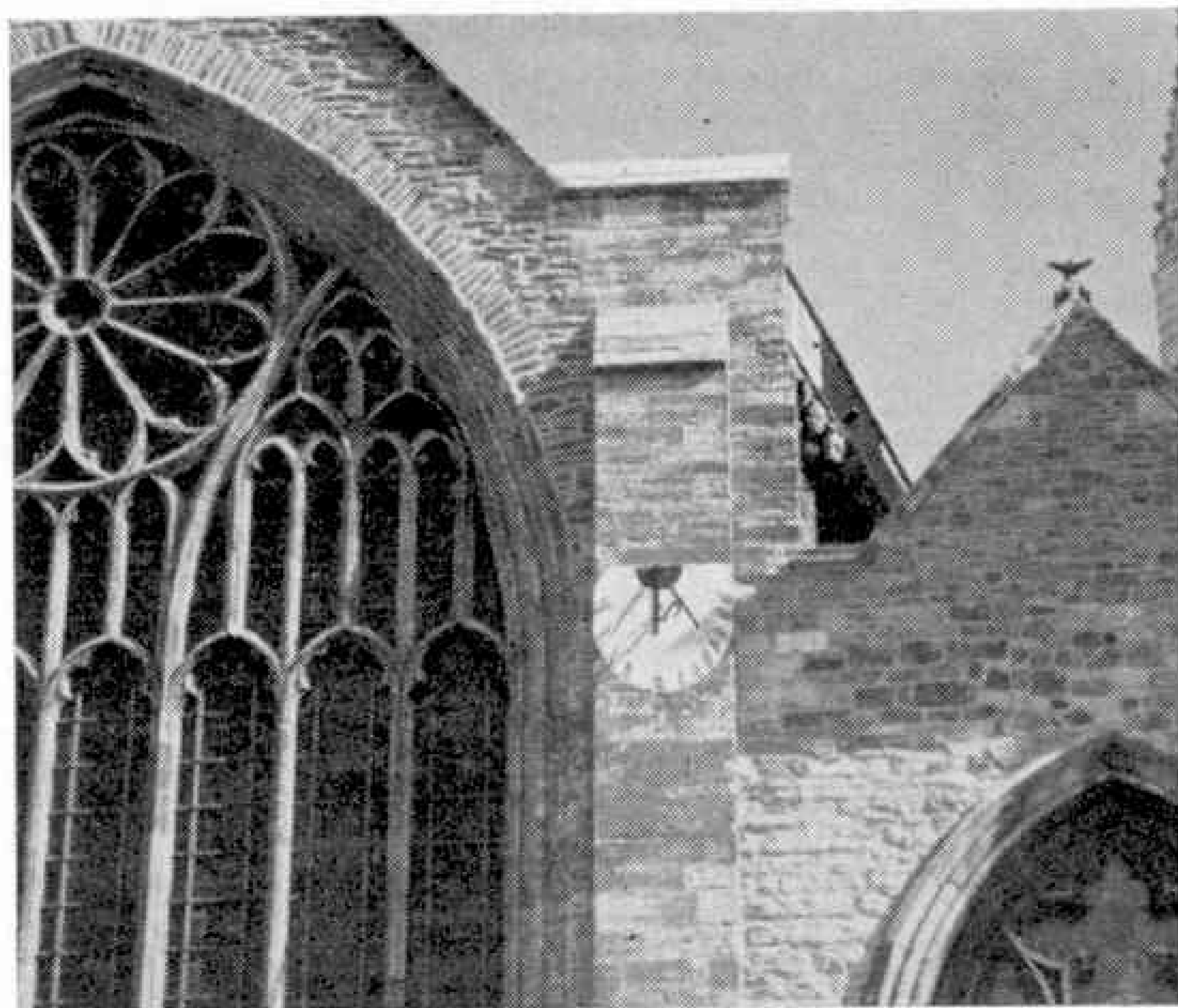


A modern sundial, to be seen in the Parade Gardens, Bath.

to see a sundial and a clock on the same spire.

The Earth turns upon its axis from West to East once in each twenty-four hours at a uniform rate, and it also travels round the Sun once each year, almost at a uniform rate. If we do as the early civilised people did, and assume that the Earth doesn't move, the Sun and stars must be thought of as turning round the Earth from East to West once each day. The Sun's day, however, would be longer by four minutes, because it lags behind the stars, which move at a uniform rate. A





This sundial is on the wall of St. Marks, Bristol, which is known as the Lord Mayor's Chapel and is the only civic chapel in England.

line drawn through the Earth's centre from pole to pole is the axis round which the Sun and stars revolve. But a line drawn parallel to this axis through any part of the Earth's surface would serve as well, because the radius of the Earth is so small when compared with the distance of the Sun. The angle of elevation of this line is equal to the latitude of the place where it is drawn.

Now sundials consist primarily of the dial and the upright, which is technically termed the style or, sometimes, the gnomon. The style must be securely located upon the dial so that it is parallel to the Earth's axis, which we have just seen means placing it along a line making an angle with the horizon that is equal to the latitude of the place. The dial must have the hour lines accurately marked if the sundial is to be of any practical use. These lines are engraved on the dial behind the style, so that the latter's shadow will fall upon them.

The 12 o'clock line is the first line to be marked. It is positioned by finding the intersection of the sundial surface with the vertical plane containing the style. For this a plummet line is used. This consists of a piece of string secured to the style and carrying a weight. When the shadow of

the line coincides with that of the style their position is that of the 12 o'clock line, which may then be scribed on the dial.

When the 12 o'clock line has been fixed all other hour lines can be found by calculating the angle that each would make with this line. But this method is not necessary today. Instead the hour lines from 12 noon through the afternoon can be marked upon the dial by reading a watch, marking the line whenever the shadow of the style was at each particular hour or half-hour. The hour lines before noon could be marked in exactly the same manner the following day.

A sundial constructed in this way would not always be correct, as the Sun's motion varies day by day and the time as indicated by the most accurately engraved sundial would not agree with that of a clock. The clock and sundial do agree on four days each year, however. These are about 15th April, 15th June, 1st September and 24th December. During the remainder of the year, the time as indicated by the sundial differs from that shown by the clock, with 16 minutes as the greatest possible error. This occurs for a few days in November.

There are horizontal and vertical dials, dials leaning forward and backward, and even portable dials, and all are well worth examination when they are seen.



This sundial has an unusual style. It is on the porch of St. Saviour's Parish Church, Guernsey.

# Atomic Age Fighters

By John W. R. Taylor

**T**AKE a good look at the fantastic aeroplanes illustrated on these pages. Nothing like them has ever been built before; but in a few years' time their shapes may become as familiar as the conventional sweptwing fighters of today, for they are the first of a new generation of interceptors designed to meet the threat of fast, high-flying atom-bombers.

For several years it has been obvious that even the best conventional fighters cannot ensure satisfactory defence in an atomic age. Air exercises over Britain have shown repeatedly that Bomber Command Canberras can dodge our defensive screen of Meteors and Sabres without much difficulty, by flying at around 45,000 ft., where the small wings of the fighters produce little lift in the rarified air, so that their rate-of-climb and manœuvrability are poor. With even faster, higher-flying, more formidable bombers like the Valiant, Victor and Vulcan on the way, the difficulties are certain to increase.

Supersonic speed by itself is insufficient. The primary need is a high rate-of-climb—the ability to streak up to a height of 50–60,000 ft. in the minute or two during which interception might be possible.

To increase their rate-of-climb, the R.A.F.'s new Swift and Hunter fighters use reheat, in which fuel is sprayed into the exhaust gases of their turbojet engines and burned to increase the engine's thrust. It is a big help, but burns up the aircrafts' already limited fuel supply at an alarming rate. As a result, they can only be used against very high-flying bombers when the latter come within close range of their airfields.

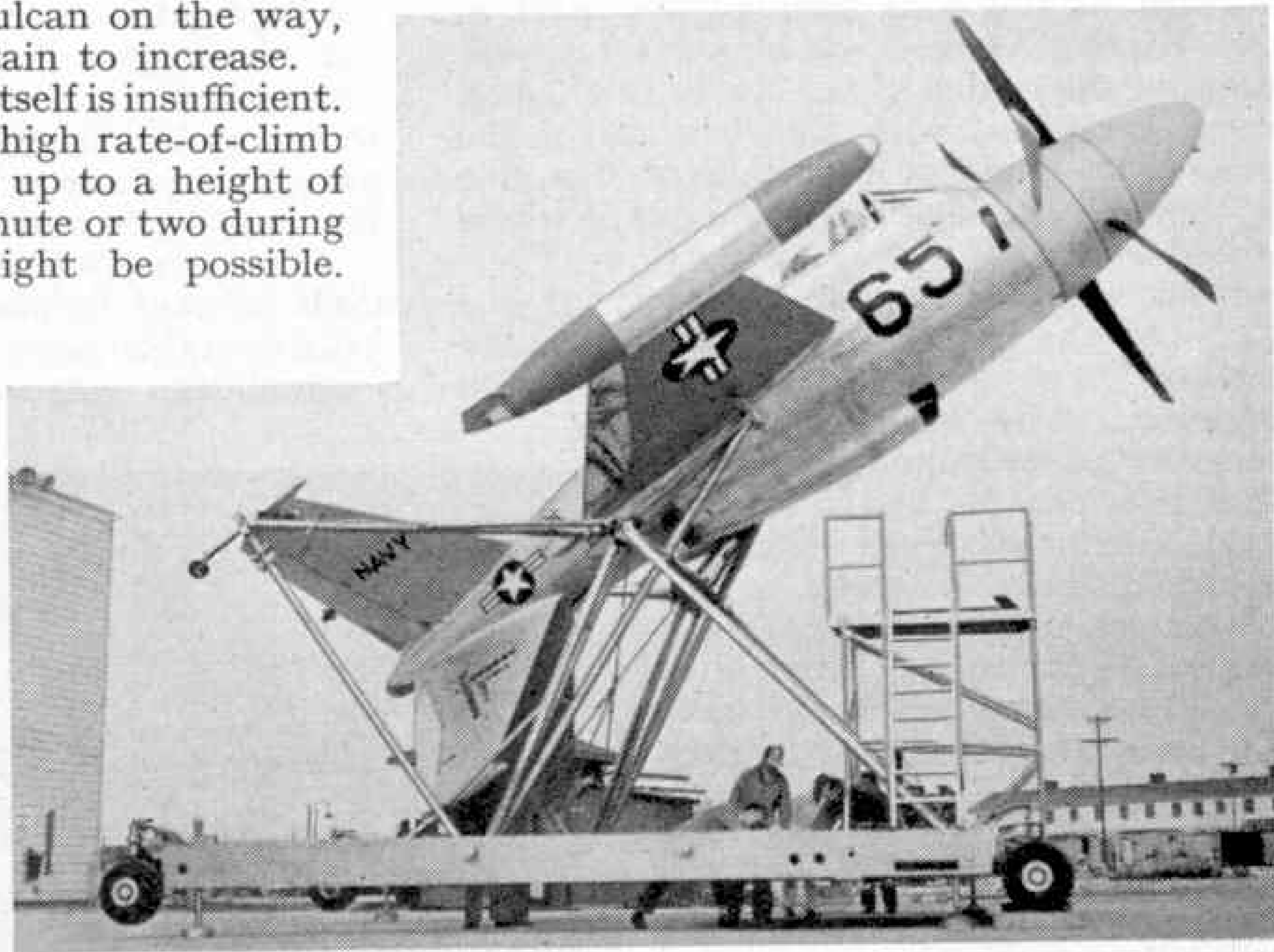
The Germans were confronted with somewhat similar problems in 1943–45. Day after day, huge formations of high-flying American bombers were pounding targets in Europe, and the *Luftwaffe's*

difficulties were increased by fuel shortage and attacks on their airfields. In particular, the ball-bearing factory at Schweinfurth was destroyed almost completely because the fighters, coming from far-away airfields, had to turn back as they ran out of fuel.

Characteristically, the Germans thought up a very bold solution to their problems—vertical take-off (V.T.O.).

Obviously, if they could launch their fighters vertically from the ground, the time taken to reach combat height could be greatly reduced. At the same time, the fighters could be flown, if necessary, from the heart of a town or factory area, making them independent of airfields and enabling them to conserve their fuel, as they need not take off until the attacking bombers came in sight.

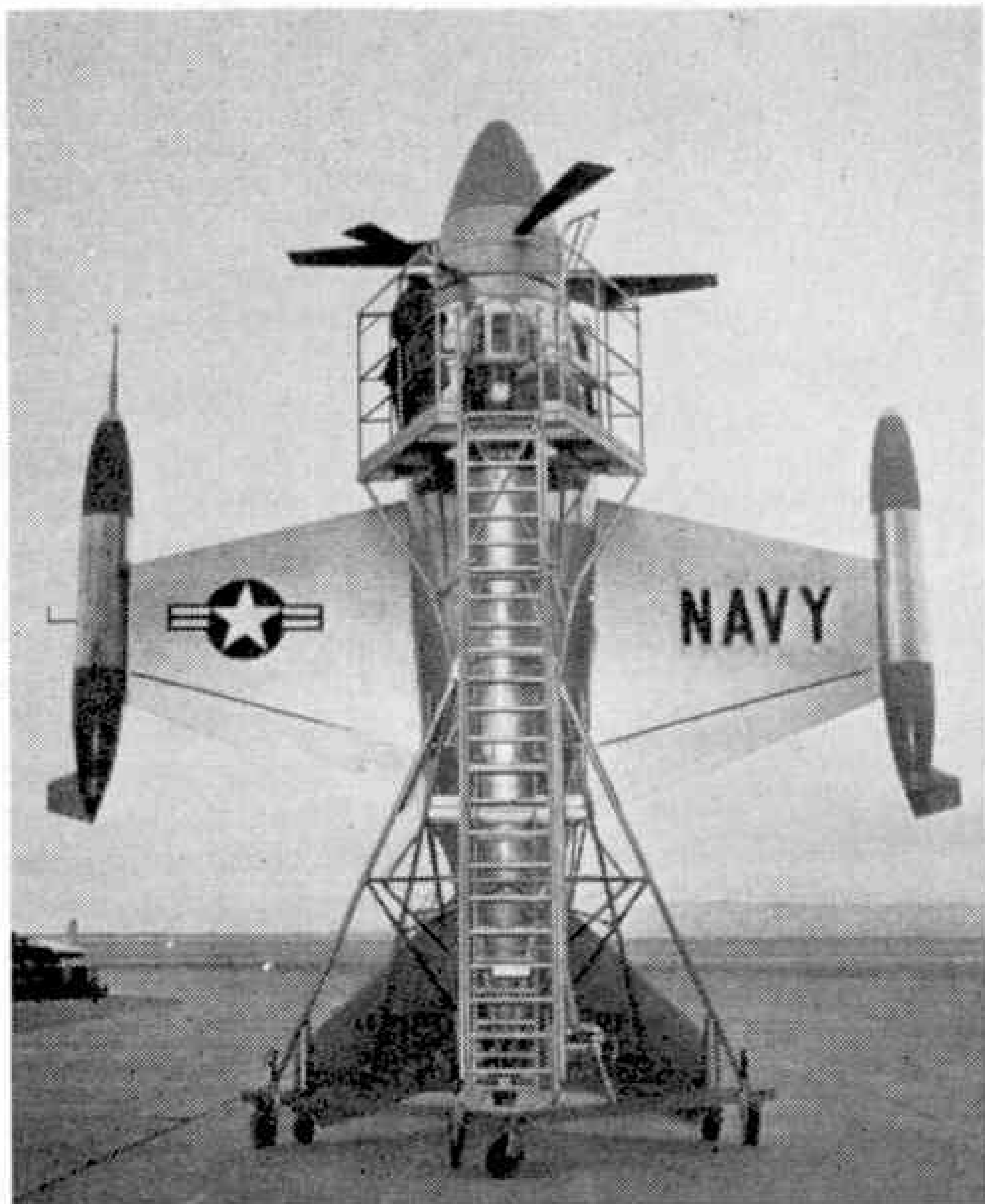
Two entirely different types of V.T.O. aircraft were designed. One was the



Lockheed XFV-1 fighter in half-raised position on special trolley used to raise it to a vertical position for take-off. This illustration and that on the opposite page are reproduced by courtesy of Lockheed Aircraft Corporation, U.S.A.

Bachem Ba.349 Natter (Viper), a tiny 18 ft. span machine powered by a Walter rocket-motor. Fired vertically from a ramp, it was designed to climb at the rate of 35,800 ft. per min. and make one 600 m.p.h. attack on a bomber with a battery of 33 rockets carried in its nose.





After which the pilot was supposed to push a button to shoot himself clear of the aircraft in an ejection seat and to break off the rear of the fuselage, containing the engine, which would be lowered to the ground under another parachute, leaving the remainder of the aircraft to crash.

Several Natters were built and tested, but the only piloted one crashed soon after leaving its ramp, and the end of the war prevented further tests.

The Focke-Wulf V.T.O. fighter was not even completed, but captured drawings depicted a strange machine, half aeroplane—half helicopter, which stood on its tail for take-off and was lifted vertically by jet-powered wings which rotated around its fuselage like a helicopter rotor. Like the Natter it was expected to fly at over 600 m.p.h.

Only other V.T.O. tests of which details have been given were made in recent years by the British Fairey Aviation Company in Australia, with 10 ft. span rocket-powered models, which proved that full-size rocket fighters could be launched vertically from ramps at speeds that would not be harmful to their pilots. The models were, incidentally, half-scale replicas of the little Fairey F.D.1 delta-wing research

aircraft, and were illustrated in the September 1953 *Meccano Magazine*.

Now we have the two new U.S. Navy experimental V.T.O. fighters—the Convair XFY-1 and the Lockheed XFV-1 which differ chiefly in their configuration. Both are single-seaters, powered by a 5,500 h.p. Allison T-40 twin-turboprop; but the XFV-1 has stubby “straight” wings, whereas the XFY-1, as one would expect from Convair, is a delta. They are designed for convoy protection, their vertical take-off and landing abilities enabling them to operate from small platforms on any warship or merchant vessel.

Even more surprising to aircraft engineers than their strange shapes is the choice of turboprop power, because to lift an aircraft vertically, its engine must, of course, develop more pounds of thrust than the weight in pounds of the machine at take-off. The most obvious way of obtaining so much power is by using turbojet or rocket motors; but Lockheed claim that the two side-by-side turbines of the T-40 are powerful enough to lift their XFV-1, although “it weighs twice as much as the average fighter of World War II”. Nevertheless, their remark that the XFV-1 “rises with such speed that within one minute it disappears from the sight of an observer” seems to indicate that the turboprop may be supplemented by jettisonable rocket “boosters” for take-off.

Work on both aircraft started three years ago, which is by no means a long time for such revolutionary designs. It was not merely a question of producing a straightforward airframe to do the job.

The U.S. Navy asked for special features, such as a tilting seat to keep the pilot in a semi-upright position during vertical flight, and special trolleys

had to be produced to carry the aircraft on the ground and raise them into a vertical position for take-off.

Although Convair’s choice of a delta-wing has resulted in a more compact design, with greater stability for take-off, Lockheed’s smaller cruciform tail has given them an initial advantage. They have been able to fit the XFV-1 with a stalky fixed undercarriage, and their test pilot, Herman (Fish) Salmon, has been able to flight test it by taking off and landing in the normal way. The length of the fin under the XFY-1’s tail prevented Convair fitting a similar undercarriage to their aircraft, and

The XFV-1 fully raised. The high mobile ladder enables the pilot to climb into his seat in the cockpit.



Here the Convair XFY-1 fighter, mounted on the special mobile vehicle used to transport it on the ground, is shown in the horizontal position that it would assume when in straight and level flight. The illustrations on this page are reproduced by courtesy of Convair Division of General Dynamics Corporation, U.S.A.

This will be the most difficult and dangerous part of the whole business, because it involves reducing flying speed until the aircraft's tail drops and the machine is left hanging in the air with its propellers working like helicopter rotors. The pilot will then have to lower it gently until its four tiny wheels touch the ground.

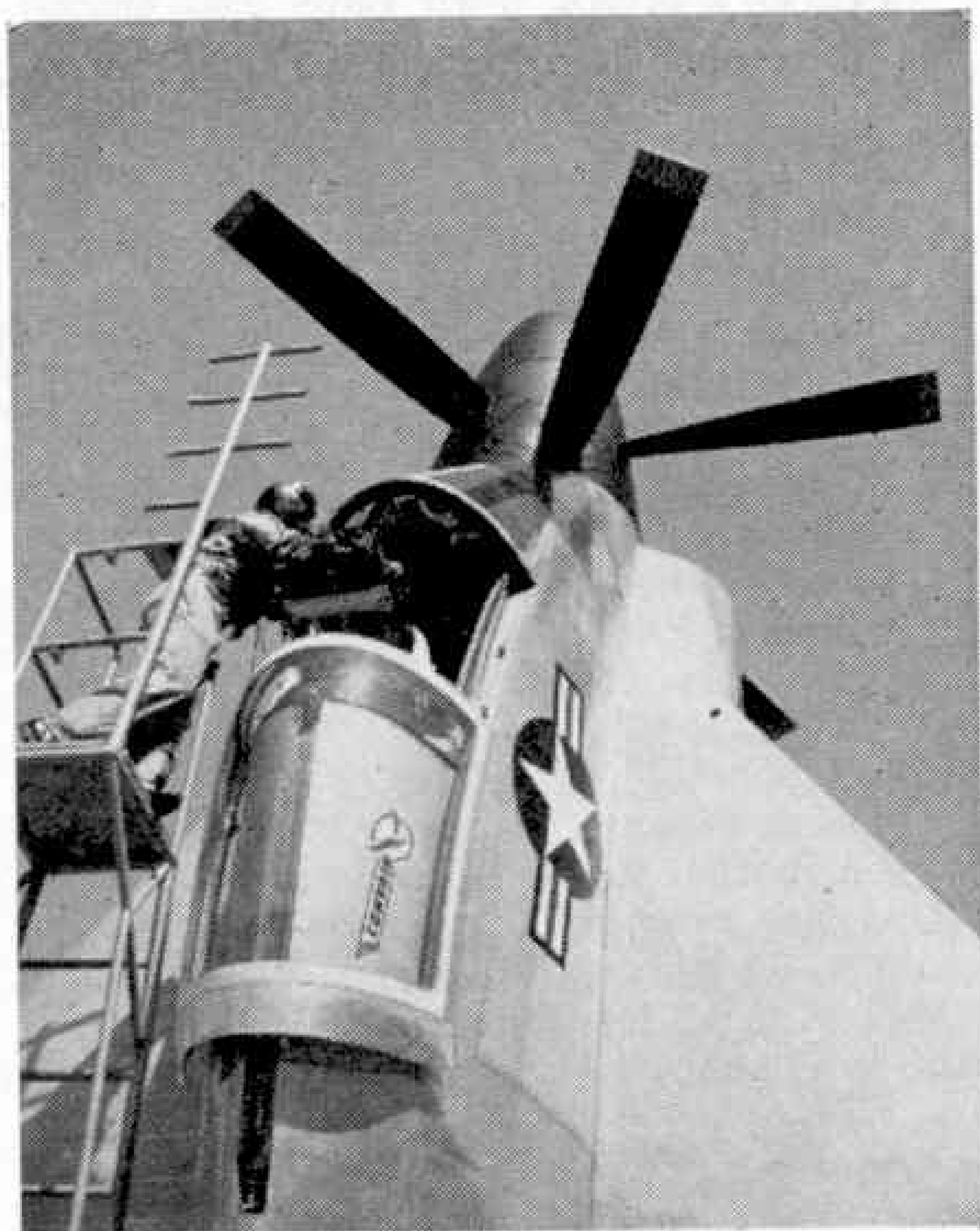
it is making its first "flights" inside a hangar at Moffett Naval Air Station, near San Francisco, tethered to the floor and ceiling by cables which enable it to rise more than 100 ft. under its own power, without ever being out of control from the ground.

It all sounds very complicated, but test pilot J. F. (Skeets) Coleman has been practising for the tethered flights for several months. Soon after the XFY-1's design was completed, Convair built a full-scale mock-up of the aircraft that was a marvel of completeness. Every item of equipment was included, and even the pilot's "tilting cockpit" worked like the real thing. Later, they built also a special engine test stand, consisting of a replica of the XFY-1's fuselage and cockpit, mounted on a vertical stand. By opening the throttle of this test "model", Coleman was able to lift the fuselage several feet upwards and drop it down, to get the "feel" of the engine and controls.

By such devices, Convair, Lockheed and the U.S. Navy have done everything possible to reduce the dangers of the early trials of these revolutionary fighters; but the *real* test will come on the day when they rest for the first time on the tiny "casters" of their tail undercarriage and take off for their first true flights. If all goes well, they will climb quickly to a safe height, level out, complete a few circuits and then attempt a tail-first landing.

This seems to many of us in the British aircraft industry the chief drawback in the concept of the XFY-1 and XFY-2. A highly-skilled test pilot could almost certainly achieve such a landing under good weather conditions. But these are naval fighters, and it is rather horrifying to picture ordinary Service pilots trying to land tail-first on the deck of a ship that may be pitching or rolling in a heavy sea.

A more practical solution seems to be to land on retractable (Continued on page 408)



Convair test pilot J. F. (Skeets) Coleman steps from specially-built ladder into the cockpit of the XFY-1, here shown in a vertical position.



# BOOKS TO READ

Here we review books of interest and of use to readers of the M.M. With certain exceptions, which will be indicated, these should be ordered through a bookseller.

## "THE THIRD WOODHEAD TUNNEL"

By GEORGE DOW (British Railways 1/6)

Nowadays the driving of a long main line tunnel is not a very common thing, so the recent completion of the newest Woodhead Tunnel, on the main line from Sheffield to Manchester, is an event of importance. A third bore at Woodhead became necessary when it was decided to electrify this difficult route. Even today tunnelling is not without its hazards and uncertainties, and the book tells in an interesting manner how the various problems were settled and how the tunnel which was begun in 1949 was successfully completed and opened in June this year.

In the account the older tunnels, fascinating because of their age and remarkable for their length, their atmosphere, and their bleak location, are not forgotten and the illustrations show good views of their characteristic castellated ends. There are many views too of the modern tunnel in different stages of construction, these pictures forming a remarkable record of a kind impossible for the older ones. In addition to half-tones, well reproduced, there are several diagrams and line drawings of special interest.

Copies are obtainable at 1/6 each, from District Publicity Representative, British Railways (London Midland Region), 64 Cardington Street, London N.W.1.

## "OUR EVEREST ADVENTURE"

By Sir JOHN HUNT (Brockhampton Press 12/6)

The whole world was thrilled just over a year ago when it became known that Edmund Hillary and a Sherpa named Tenzing, of the Expedition led by Brigadier John Hunt, had succeeded in reaching the summit of Mount Everest, the hitherto unconquered peak in the mighty Himalayan range and the goal of many unsuccessful expeditions in the past. The dramatic story of this great achievement has been told by Sir John Hunt in his book *The Ascent of Everest*, and the work reviewed here is by way of being a companion volume to that epic story.

It is mainly a pictorial record of the event, and the majority of its more than 150 magnificent pictures in photogravure have not been published before. They include all the important photographs taken on the final assault and from the summit by Sir (then Mr.) Edmund Hillary. As far as possible the pictures have been arranged in chronological order, and vividly portray both the awe-inspiring scenery and the immense difficulties that had to be overcome. The pictures are supplemented by brief descriptive notes in diary form, that help us further to appreciate the magnitude of the task so brilliantly and successfully accomplished.

## "ABC BRITISH MOTOR CYCLES"

By DOUGLAS ARMSTRONG

## "ABC BRITISH WARSHIPS"

By H. M. LE FLEMING  
(Ian Allan 2/- each)

The 1954 edition of *A.B.C. British Motor Cycles* is on the same lines as earlier issues. In addition to excellent half-tone illustrations and descriptions of the various motor cycle manufacturers' products, it contains a complete specification section giving comprehensive information on every British motor cycle in production today. Racing and competition work have played a large part in the development of the modern motor cycle, and the author has tried wherever possible to give something of each company's racing or competition background.

*A.B.C. British Warships* extends still further the

wide range of these handy little *ABC* books, and includes the ships of the Commonwealth Navies in addition to those of the British Navy. The types of warships dealt with range from battleships, aircraft carriers and cruisers to coastal craft, depot and supply ships, the last-mentioned section being a selection of some of the great variety of auxiliary vessels engaged in the maintenance of the fleet and its bases. The ships are arranged in classes, and where those of more than one of the Commonwealth Navies belong to the same class they are all grouped together. Technical details given include length, beam, displacement, type of engines, armament and complement. In the case of aircraft carriers the number of 'planes carried is also shown. There are excellent half-tone illustrations of a typical vessel of each class.

## "HISTORY OF THE STEAM TRAM"

By A. H. WHITCOMBE (Oakwood Press 5/6)

Among those interested in early forms of locomotion, the late Dr. A. H. Whitcombe's paper *History of the Steam Tram*, which was read before the Institution of Locomotive Engineers in 1937, has become famous. Before that, the subject scarcely seems to have been dealt with to any great extent. Now the Oakwood Press have published the major part of Dr. Whitcombe's paper, which remains a standard work on the subject, as one of their excellent "Locomotion Papers", of which series it forms number nine.

Many young *M.M.* readers may never have heard of a steam tram, for the species vanished long ago from these islands. They flourished between the 'eighties of the last century and the early years of the present one. The largest system covered the Black Country. It had a network of 67 route miles, about 200 locomotives and 180 cars. Industrial areas of the North and Midlands were the chief haunts of the steam tram, though there were rural systems as well, the last to survive being the well-known Wantage Tramway, in Berkshire, which was not entirely abandoned until after World War II.

The booklet describes in detail the vehicles themselves rather than the systems upon which they operated. There are many illustrations and these are of a high standard and of great historic interest.

Copies of the booklet are obtainable from the Oakwood Press, Tanglewood, South Godstone, Surrey, price 5/9 including postage.

## "THE OUTDOOR BOOK"

By JACK COX (Lutterworth Press 12/6)

This book, by the Editor of the *Boys' Own Paper*, is intended mainly for teachers and youth leaders of all kinds who want to do some practical outdoor work with young people, but *M.M.* readers who are fond of rambling, camping and exploring will find much of value in it for themselves. Drawing upon his long experience as a leader of groups of young people on outdoor rambles, camping trips, field surveys, etc., the author makes many practical suggestions for ensuring the success of such ventures. He discusses various proved methods of trekking, such as lightweight camping, Youth Hostelling and tramping, hill walking and fell scrambling, and exploring by cycle and by water.

Turning then to the important problem "What to do on Trek", he deals with outdoor activities ranging from animal and bird watching, plaster casting, collecting butterflies, moths, wild flowers, etc., to map-making and field survey, geology and archaeology. Finally there is an interesting chapter on field sports.

There are many good line drawings and nearly 60 first-rate half-tone illustrations.



## The Tulip Rally in a Consul

By Jack Reece

"THE Tulip Rally, a piece of cake, old boy! Just a pleasant Springtime tip-toe through the tulips and a good party at the end"—this was the approach of most of the 280 International competitors in this year's event.

A flying trip to Holland and the Nurburgring in Germany a week before, had given Peter and myself an idea how difficult the very sporting Dutch organisers intended this Rally to be. From our many friends on the Continent we gleaned scraps of information substantiating our original idea that the organisers wished to make the 1954 Tulip Rally the toughest ever known. How well they succeeded can be judged by the fact that only 138 entrants reached the final control, of which a mere 44 were without penalty marks for loss of time en route. When one adds that over half the finishers were damaged, the reader will gather just how tough this event was.

Ready for the final test at Zandvoort race track, with the author's Consul on the right of the line. The Reece's were 19th in General Classification, and first in the 1,300-1,600 c.c. class.

The start line at The Hague at 5.30 on a beautiful sunny evening presented its usual air of orderly chaos. We were ensconced in the luxury of a Works prepared, but very standard Consul, our first venture in this model in the field of International Motor Competition. Looking around, the opposition appeared formidable. One friendly car stood out among the immediate numbers around us. This was

Number 175, a second Works-entered Consul driven by our old friends Bill Fleetwood and George Read, essaying their first Tulip Rally, but already Trials and Monte Carlo veterans.

The start line instructions were simple—from The Hague, via a route control at Liege, drive to Luxembourg and from there on to the central marshalling point of the Rally, the famous 13.9 mile Nazi-built German Race Track called the Nurburgring. The official instructions then stated, "The organisers will hand you your road book with the remainder



First place in the Special Series, up to 1,300 c.c. class, was taken by M. Gatsonides, seen here on the left of his Ford Anglia, and his co-driver T. Foster.



of the route detailed on leaving the Nurburgring," an ominous note to those knowing the countryside in that area.

We reached the Nurburgring without incident in the early hours of Monday morning, parked our car as directed and were told to report back at dawn, in approximately 1½ hours' time. At our appointed time we drove up to the check point and Peter, in the co-driver's seat, was handed the official road book, while I was informed that the first of the special Speed Tests would start almost immediately. This turned out to be one lap of the Nurburgring, 13.9 miles, to be covered by cars in our Class within a maximum time of 17 minutes. Not a very difficult task, one would think, except for the fact that in that distance the Nurburgring rises and falls 3,000 feet and manages to pack 159 bends in for good measure, including the notorious Karussell Curve, which can only be compared with a fairground "Wall of Death" with its 320 degrees curve banked to a maximum of 56 degrees.

Our Class was started at one minute intervals, and we were immensely heartened by the sight of an Opel appearing in front of us. We were equally disheartened by the sight of an English-entered Aston Martin

upside down on the edge of the first left-hand bend. Had we known that this was only the first of some 40 odd crashes we were to witness during the course of the Rally, we would have been even more disheartened. But ignorance is bliss, and with the Consul responding magnificently we completed the distance in the allotted time.

As we drove away along the road to Saarbrücken and the French frontier, Peter examined the road book to see what lay ahead. The special timed sections of the Rally were entered in red ink, and the road book appeared to be one red mass! Through Saarbrücken and on to Dabos high in the Vosges Mountains, where the first of the special stages began, meant that 11 miles of twisting third class Alpine roads had to be covered at an average of 39 miles an hour.

This, and the following three miles, were accomplished successfully, though the fact that the longest section was only 14 miles, did little to rest the Consul's engine. One remembers the sight of a Peugeot upside down, and 20 feet down, and the Dutch driven DKW on its roof during the hectic ride, but the advantage of safety belts similar to those fitted on our Consul was proved by the fact that in neither case were the occupants injured. The next stage of the run to



Cars are decorated with flowers on reaching the finishing point of the Tulip Rally.

Belfort control included a timed climb from St. Maurice to the top of the Ballon d'Alsace, 5.8 miles in length and rising over 2,500 feet. Apart from the fact that the Consul registered 50 m.p.h. in second gear for the entire distance without apparent harm, the climb was uneventful.

Things were vastly different on the next special stage—a three-mile timed *descent*, something hitherto unknown in International Rallying. Wreckage both on, off and below the twisting down-hill road proved only too well the capabilities or incapacities of the modern car and/or driver. Brakes were at a premium, and to conserve them a little, on the numerous

over the twisting Cote de Brenne, once again at an average of 39 m.p.h. More skids at the roadside, broken down walls and snapped off trees gave mute evidence of the mistakes of others, but Peter swept the car into Morez, the end of the special stage, with over one minute in hand, remarking light-heartedly, "These Consuls handle well," to which I recall fervently answering, "It's just as . . . well."

At the next time control, at Champagnoles, the organisers of the Rally had thoughtfully given us one hour's rest—nice of them. It was there that we caught up with the rest of our team mates, and were delighted to hear that the Scott/Phillips and Harrison

Zephyrs were both on time, whilst George Read and Bill Fleetwood with Nancy Mitchell were also motoring strongly. Other competitors were not so fortunate, and over 20 cars were in



The Consul driven by Jack and Peter Reece on the Zandvoort Race Track, Holland.

hairpins, it became necessary to engage second gear in the Consul at speeds up to 60 m.p.h., but the engine continued to carry on faultlessly. The slight consideration we had shown the brakes paid off when the Dutch officials, immediately on the conclusion of the down-hill test, introduced a 300-yard acceleration and braking test. Many competitors were unable to stop on the braking line and two cars left the road completely, owing to brake drum distortion and over-heating, catapulting their cars in every direction except those their drivers intended.

Belfort was reached on time, and then off again into the Juras, through the Defile du Coin de la Roche, and on over the winding mountain roads to St. Claude, a nice long 130 miles stretch that gave us both a chance to sleep. Immediately after the St. Claude check came special stage No. 6, 17 miles

obvious mechanical difficulties.

And so we went on, with special stages and incidents crowding our lives. By this time we had given up crossing off the numbers of

wrecked rivals we saw at the roadside. The third night of the Rally produced one of the most hectic special stages Peter and I have known, a 24-mile ascent and descent of the Grand Ballon, a notorious Alpine Pass. This one really sorted the remaining competitors out. A 4,500 foot climb did little to help cars to maintain the 42 m.p.h. average. Ice over the top caused many accidents and near accidents, and it is sufficient to say that of the entire entry in the Rally only 44 were left on time at the finish of this stage.

Peter and I are still wondering how the Consul did it, for if ever there was a case of mechanical murder, this was it. Bill Fleetwood and George Read hurled their Consul over the finishing line of this special stage with a precious 15 seconds in hand, whilst our own combined efforts gave us a lordly minute to spare. (Cont. on page 408)



## HOW THINGS ARE MADE:

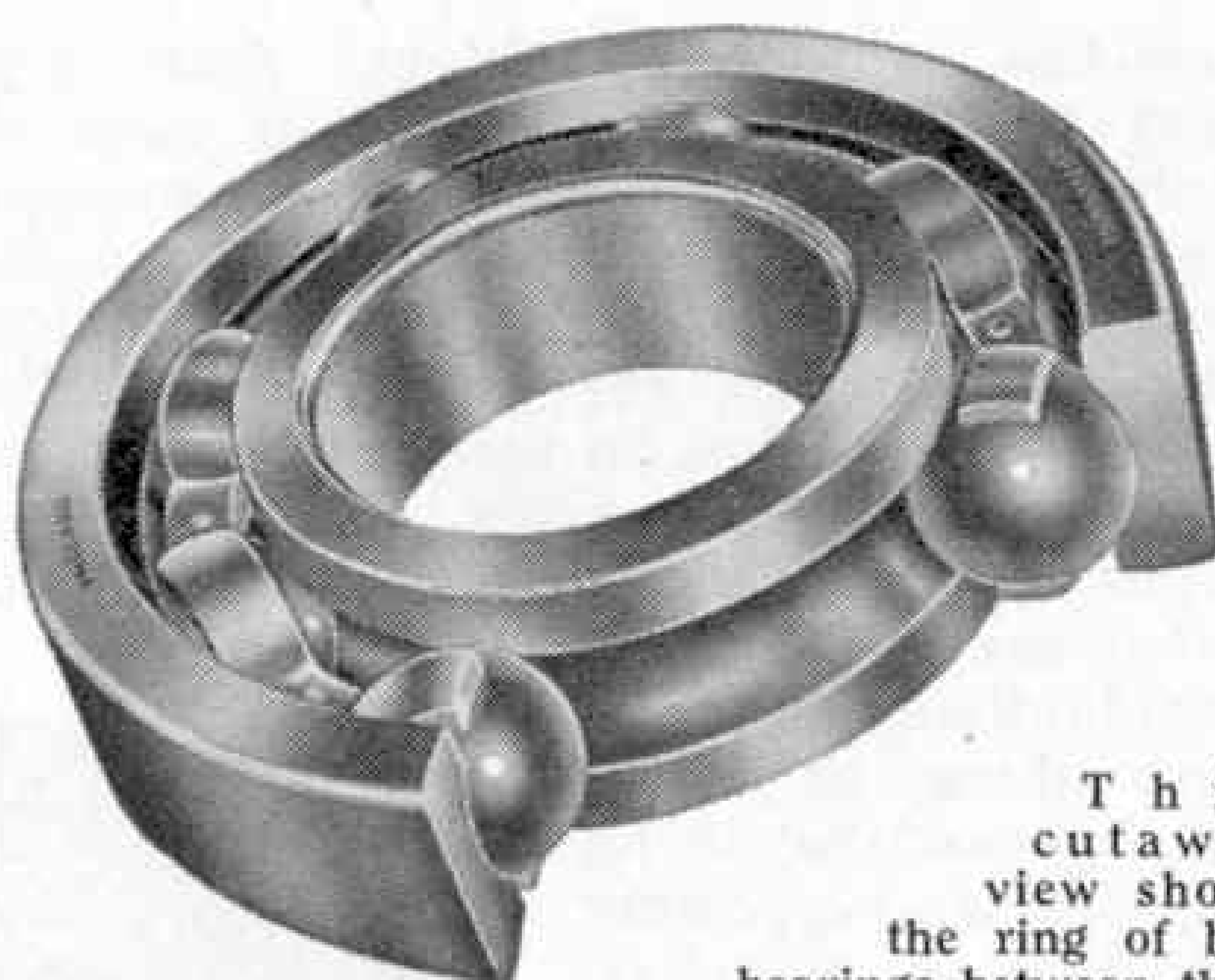
# Ball and Roller Bearings

By Bernard Clement

ROLLING bearings are indispensable in this age of speed, and yet they have links with early history. They are mentioned in the works of Leonardo da Vinci, and in 1928, when the Italian Lake Nemi was drained, a ball bearing device was found that dated back to the time of the Emperor Caligula.

So much for the antiquity of ball bearings. How are the modern bearings made? The races, that is the outer and the inner ring between which run the balls or rollers, are usually turned from solid bars of chrome steel in automatic lathes. Those over a certain size are forged and then turned. The automatics are cleverly designed machines with six spindles, each of which is tooled to perform an operation, so that the components are fully formed when taken from the machines. The parts are tested periodically at this stage, but unless a tool wears or a mechanical fault occurs these machines go on producing in a way quite amazing to the casual eye.

The pieces are stamped with the makers'



This cutaway view shows the ring of ball bearings between their inner and outer races,

and the cage that keeps the balls in position.

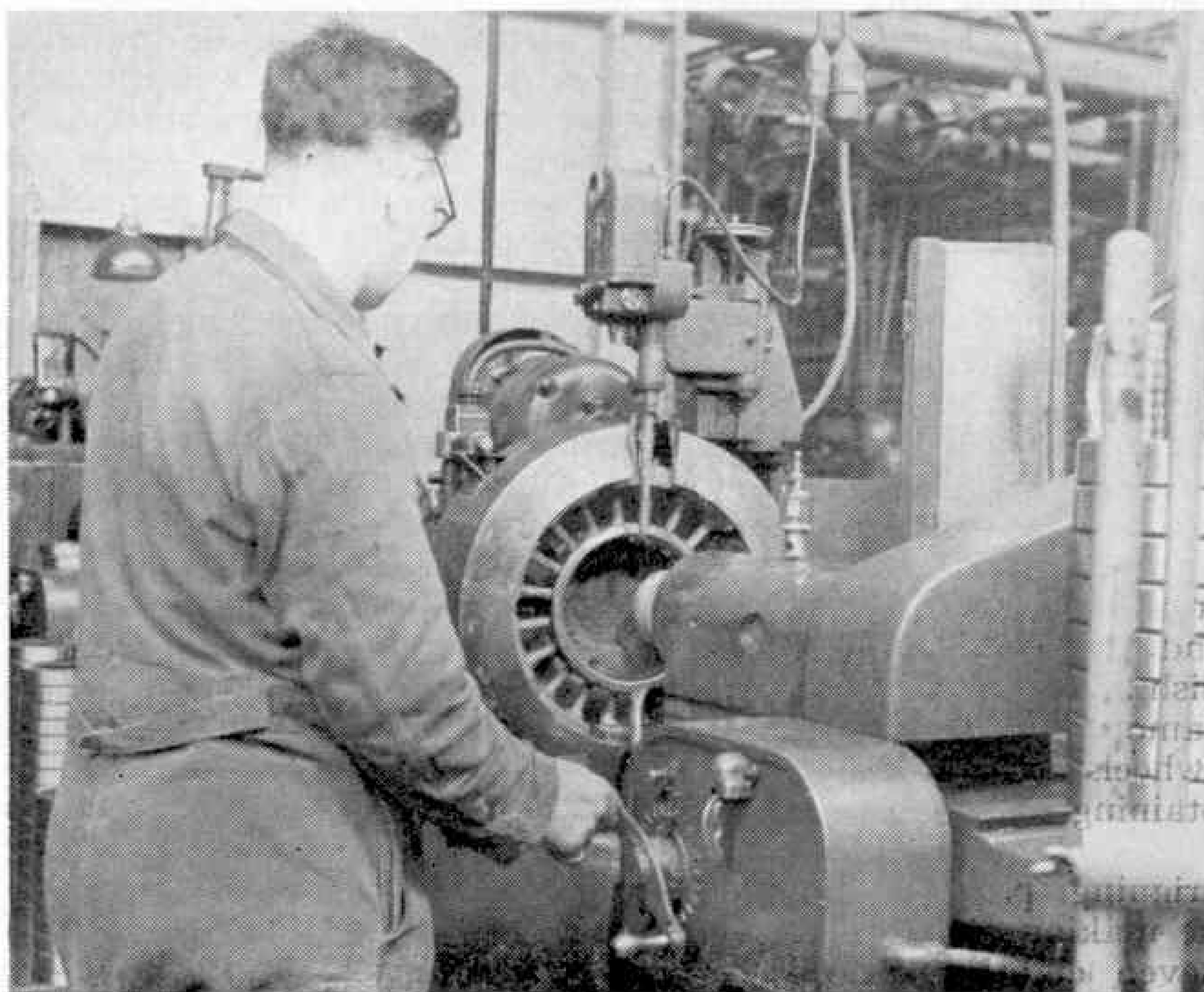
identification marks and completed on other machines, then degreased and turned into a store, from which they are issued in batches for the next process. This is heat treatment, in which the smaller races are hardened in oil and then tempered in circulating air-furnaces. Larger races are carburised in a bone-charcoal compound before being tempered.

From hardening we follow the races into the grindery, where they undergo a multiplicity of operations and from where eventually they appear ready for fitting and assembly. Their first call is the section where the faces are ground, and here two types of machine are in general use. One machine, called the Gardner, actually grinds both sides of the race at

once. In the case of the machine known as the Blanchard, the pieces are fed on to a large magnetic chuck, which revolves slowly beneath the grinding wheel. The manufacturing tolerances for width between the two faces are usually nominal to a thousandth of an inch, or half the advertised tolerance.

From facing we pass to where the outside diameters of both the inner and the outer races are ground in

Finish grinding of outer races. The illustrations for this article are reproduced by courtesy of the Hoffman Manufacturing Co. Ltd.



centreless grinding machines. Here the parts are fed along a V-shaped channel to the grinding wheel, the facing operation having made it possible for them to be ground reasonably true. But for the final grinding operation the pieces are usually mounted in batches on arbors, or spindles, which makes for greater accuracy and allows taper and size to be easily checked. Tolerance for the outside diameter varies from three to seven ten-thousandths of an inch, for bearings under one inch in diameter, to 13 to 18 ten-thousandths for bearings from five to

The final precision grinding of the balls themselves is carried out in the machine shown in this illustration.

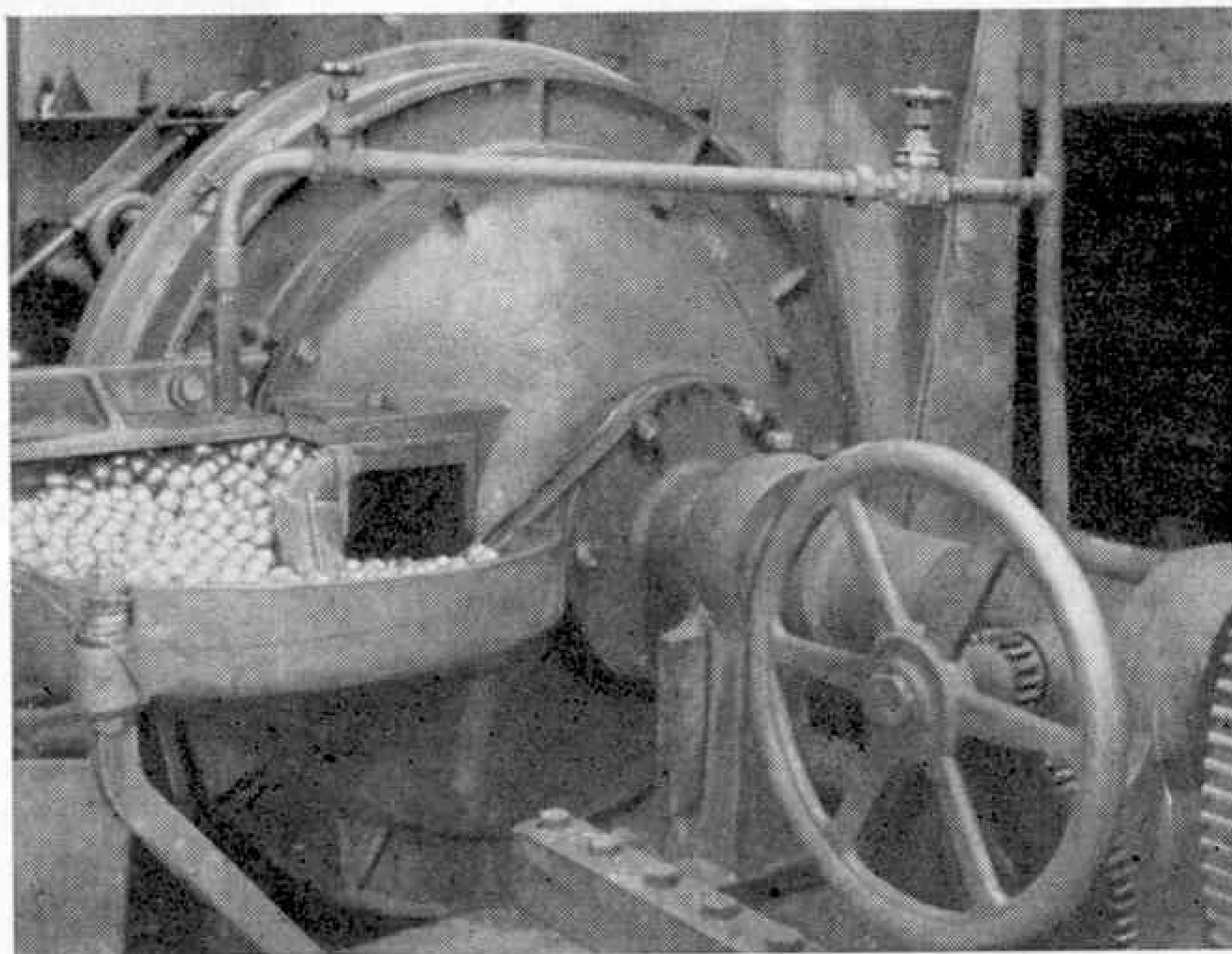
twelve inches in diameter.

The machines in which the ball tracks of the outer rings are ground have oscillating work heads that automatically give the required curvature of the tracks. The inners are tracked to suit the outers, so that they can be paired at the fitting-up stage. After grinding all ball tracks are polished, which has a very important effect on the life and performance of the bearing and is not done, as some people might imagine, simply to improve the appearance.

A different type of machine is used for grinding the bore of the inners, and although the finish is not so high the tolerances for size are keen. In the fitting-up department the sizes of newly-ground outer races are graded in steps of a ten-thousandth of an inch, and the sizes are noted so that requirements can be called for from the inner tracking machines. The races for roller track bearings are ground in machines common to industry, but the same high standards of finish are obtained. Good quality industrial diamonds are used when dressing grinding wheels, and are an important factor in obtaining accuracy and finish.

Perhaps the most intriguing part of bearing manufacture is the making of the steel balls. Balls over seven eighths of

an inch in diameter are hot forged from slugs of steel, but the rest are formed from wire or rod in cold-heading machines. The wire is fed automatically into the machine, where it is cut into small pieces, each of which is carried between two dies and formed into a rough ball. After being annealed, cold-headed balls receive a clean-up in a machine with a rotating



file plate. Hot forged balls are rough ground in a machine with a vertical grinding wheel.

The final precision grinding of the balls is done in a machine with a horizontal grinding wheel rotating against a stationary cast-iron plate. This has a series of grooves, along which the balls are rolled by the pressure of the grinding wheel. As the balls travel along the grooves in an anti-clockwise direction a finger diverts them to a mixing channel, from where they are continuously redirected into different grooves again. Throughout the operation the axes of rotation of the balls are thus constantly changed, ensuring that the entire surface areas are ground and each ball becomes a perfect finished sphere.

After grinding the balls are hardened in rotary-type furnaces, into which they are fed through a hopper. The balls reach a temperature of 820 deg. C., while the furnace rotates slowly and finally lets the balls drop into a tank of water. Tempering at 125 deg. C. in a circulating air furnace completes the heat treatment.

Tumbling in barrels containing abrasive



removes the scale formed in the hardening process. After a further grinding with a fine grit wheel, the balls are lapped between two cast-iron wheels, an operation performed with the use of a paraffin-based oil, in which the actual amount of material removed is about half a ten-thousandth of an inch. They are finally brought to size by tumbling in a solution of rouge in paraffin, which has a refining effect upon their surface, and then they are given a tumbling in a solution of caustic soda. A further tumbling in sawdust, for cleaning purposes, is followed by tumbling in barrels lined with wood and containing chamois leather to remove all impurities, particularly moisture, from the balls and to give them a beautiful finish.

The balls are accurate to within a ten-thousandth of an inch of the nominal dimension. The final inspection is visual, and is carried out under diffused lighting by girls, whose experienced eyes can detect the slightest flaw. Chamois leather

follows at 125 deg. C. and tumbling in abrasive to remove scale is the next stage, after which the ends and diameters are ground. Before they receive a final all-round grinding they are tumbled in fine polishing powder. After finished grinding into the barrels they go once more for tumbling in chrome oxide, which is a polishing agent. When they have been dried in sawdust and polished with chamois leather they are ready for inspection.

Now a word about cages. The cage is the part of a bearing that separates the balls or rollers, and keeps them in position at even intervals between the two tracks. Only the largest cages are machined and they are made from bronze bar or thick-walled tubing. Most cages are pressed out of brass or steel strip and in some cases duralumin and plastics are used. In the case of the machined cages the holes for the balls or rollers are drilled out of the solid in machines on which is a jig to ensure the accurate spacing.

The completed parts are assembled by hand, but the rivets for holding the cage are inserted by machine. After being assembled the bearings receive a final inspection. Inspection is very important in

Most cages are pressed out of brass or steel strip. The largest are made from bronze bar or tubing.

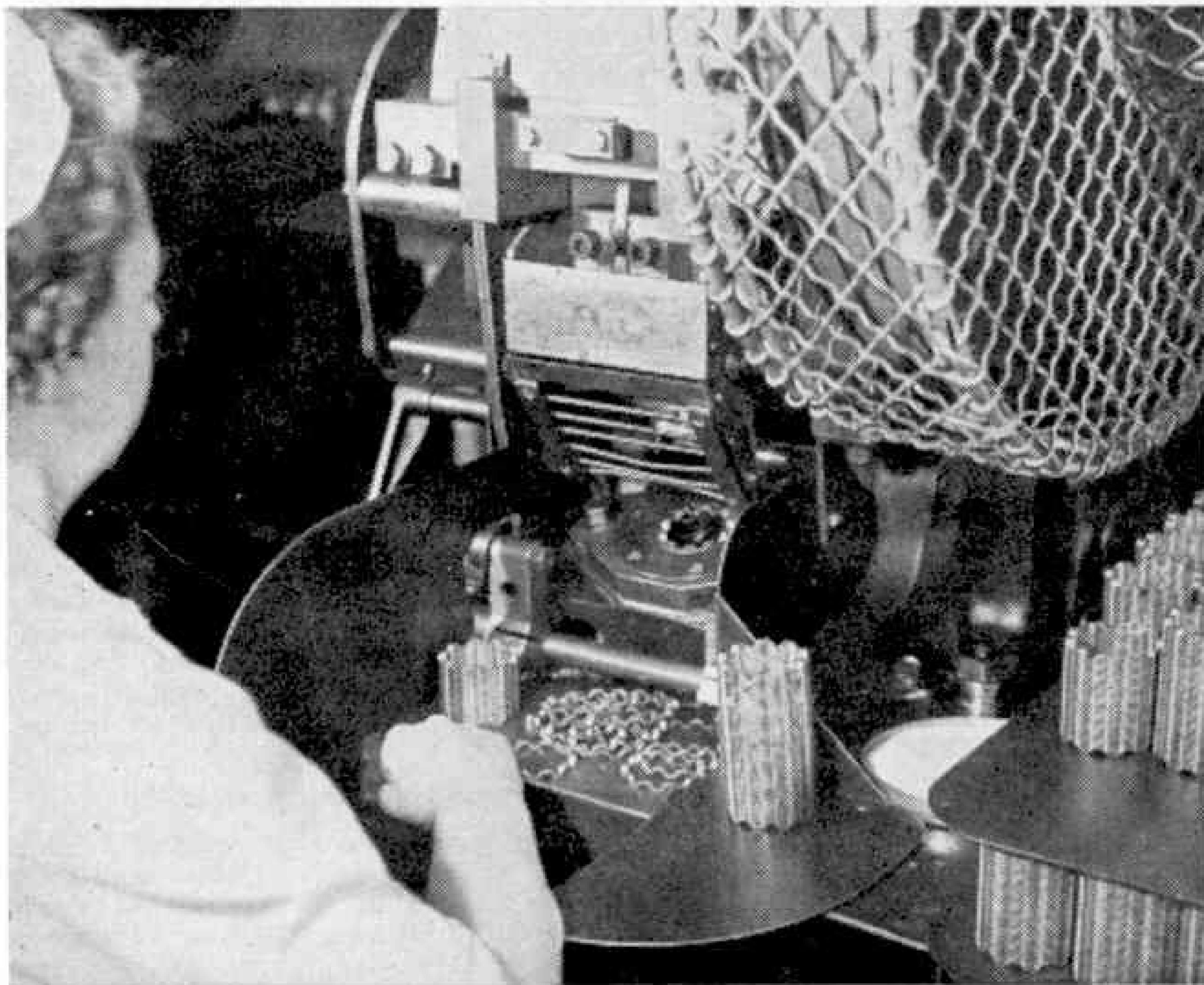
maintaining the high standard of bearing production, and at all stages there are fixtures, some of them quite ingenious, for the checking of work. Although in some operations measuring is done with

gloves are worn while the finished balls are being handled.

Chrome-carbon steel bar or wire is used in the making of rollers. The diameter of the bar is ground in centreless grinding machines before it is cut into sections suitable for rollers. Rollers are hardened in oil, being heated in the same type of rotary furnaces as used for the balls to a temperature of between 820 and 830 deg. C. Tempering in a circulating air furnace

micrometers, plug-gauges for bores and templates for radii and chamfers, there are scores of sensitive indicators in use which have to be carefully maintained.

Bearings of one kind or the other are used for such diverse things as air-screws, turbines, roller skates, sliding doors, vehicles, scientific instruments, cycles, locomotives and artificial limbs. The anti-friction bearing has in fact done much to help in the smooth running of the world.



# Railway Notes

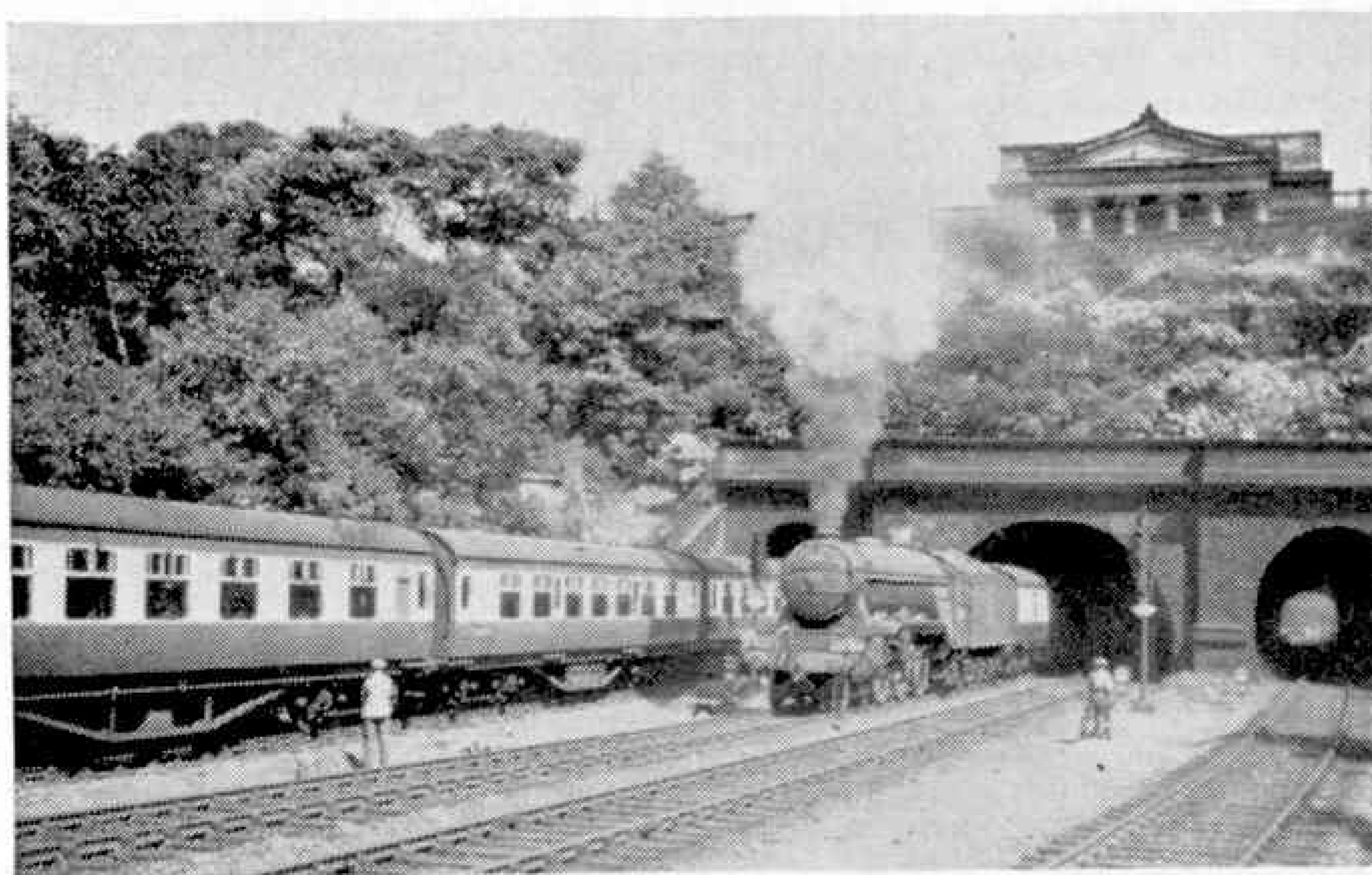
By R. A. H. Weight

## Developments in Diesel Traction

The British Transport Commission has placed orders with contractors for 36 motor vehicles and 36 driving trailers of lightweight diesel passenger unit type, fitted with A.E.C. engines and Wilson gearbox transmission, for use on branch or cross-country lines in accordance with the plans already announced. Orders also have been placed for 170 sets of equipment for 350 h.p. diesel-electric shunting locomotives to be built in British Railways' workshops. So far 28 are on order at Darlington and 50 at Derby, as part of a five-year 573-engine programme.

## Novel Special Train Tours

Railway enthusiasts and Society members are being



Tunnel face and trees make an effective background to this Scottish Region scene. No. 60089 Felstead is leaving Edinburgh (Waverley) for Aberdeen. Photograph by G. D. Bonner.

regaled again this year with a variety of opportunities for travel over routes not ordinarily available for passengers. The trains arranged for them run behind unusual locomotives and provide a combination of journeys without change of carriage in the course of one day that are quite unobtainable in the ordinary way.

On one of these trains I travelled under the auspices of the Stephenson and Manchester Locomotive Societies by courtesy of the owning authority along the County Mental Hospital Railway from Whittingham to Grimsargh, Lancs., in a bare ex-L.N.W.R. goods brake behind the last surviving L.B.S.C.R. D1 0-4-2T, sold by the Southern Railway as their No. 2357 in 1947 and now named *James Fryars*. This was painted light green and still displayed many Brighton features. We then transferred to an imposing 7-coach special formed of saloon coaches with armchairs, as used for North Wales Cruise Trains in summer, hauled with many shunts and reversals by 2-6-4T No. 42316 and traversing the Longridge, Pilling, Glasson Dock, Lancaster Old (terminal) station and Arnside-Hincaster Junction branches, long disused for ordinary passenger services, returning late at night to Preston after having been into Westmorland and on the edge of the Lake District.

On the *Trains Illustrated* special exciting novelties included a non-stop run from Waterloo to Bournemouth behind Schools 4-4-0 No. 30932 *Blundells* in 2 hrs. 2 min., including 8 min. delay due to engineering and track work. This was a good deal quicker than the normal best time for the 108 miles with heavier trains hauled by large Pacifics, with a Southampton stop. *Blundells* then went straight on with class 2 4-4-0 assistance over the severely graded and curved Somerset and Dorset route to Bath. We returned behind two 4-4-0s numbered 40601 and 40698 as far as Evercreech, where the latter assistant engine was detached after storming over the Mendips, No. 40601, which began with us at Bournemouth, carrying on to Templecombe, where *Blundells* which had preceded as light engine was waiting to haul us to London in completion of an arduous 331-mile round. From Salisbury the 83½ miles were covered in 85½ min. to Waterloo, arriving nicely to time. The train, weighing 285 tons full, included second class (Continental) brake coaches and restaurant cars, in which excellent meals were served and attained speeds just over 80 m.p.h. in each direction on the S.R. main line.

A Stephenson Society special commemorating the centenary of the first sections of the former London, Tilbury and Southend Railway was accorded a civic reception at Barking. It carried over 450 members and friends to Thames Haven, Essex, and back over an interesting, unusual route through eastern London suburbs from Fenchurch Street, traversing parts of what were L.N.E.R. (Great Eastern) and former North London and other L.M.S. territory. The engine was 0-6-2T No. 41983, built about 50 years ago by the L.T.S.R. and in that company's time painted green and named *Hadleigh*.

The Railway Correspondence and Travel Society's Lincolnshire tour provided other rare travel opportunities locally

behind J6 G.N.R. 0-6-0 No. 64199, as well as smart runs over the Nottingham-Lincoln section by L.M.R. compound No. 40935.

## The New Woodhead Tunnel Opened

The culmination of more than four years of difficult work upon which approximately 1,100 men were employed, housed meanwhile in a hutted camp situated in a wild moorland area, the new Woodhead tunnel, which is the third longest in Britain, was officially opened in June last. It is 3 miles 66 yds. long, equipped for double-track main line running with overhead electric traction.

The new tunnel is driven through shale and sandstone and lined throughout with concrete. It is on the former Great Central Manchester-Sheffield line carrying heavy passenger and freight traffic as part of an important cross-country artery. Electric locomotives are now in process of taking over all haulage, with the exception of certain multiple unit suburban services at the Manchester end provided with electric motor coaches.

The two parallel single line tunnels superseded were not quite so long, but would have required very heavy renovation work and were unsuitable for containing the electric cables and gear. For many years it has been a laborious business to work heavy



goods and coal trains up the long incline from either side leading to the tunnels, more powerful though the locomotives became, and passing through the narrow bores was most unpleasant for the enginemen. I have vivid recollections of stout efforts by Director



"On top" views of the Bulleid 4-6-2s are rare, so this view of No. 34037 "Clovelly" climbing from St. David's to Exeter Central is of special interest. Photograph by R. Russell.

4-4-0s, Ivatt Atlantics, Robinson mixed traffic 4-6-0s and, more recently, a Thompson B1, experienced while travelling in fast passenger trains along that rather spectacular route.

#### Locomotive Stock Alterations

New engines have lately been completed and allocated as follows—B.R. 3MT 2-6-0: Nos. 77005-7, 66C Hamilton and Nos. 77008-9, 63A, Perth. B.R. 2MT 2-6-0: Nos. 78020-1, 15B, Kettering, working the Cambridge service and Nos. 78022-7, to Sheffield, Midland, sheds. Class 5 4-6-0: Nos. 73050-2 built at Derby for the Southern Region and understood to be intended for the Somerset and Dorset Line. Class 8 4-6-2: express passenger No. 71000 *Duke of Gloucester*, 5A, Crewe North. Class 4 2-6-4T: Nos. 80081-5, 1E, Bletchley. Class 9 2-10-0 freight: Nos. 92010-4, 31B, March, E.R., of which No. 92013 proceeded first to the Rugby Testing Plant. 350 h.p. 0-6-0 diesel shunters: Nos. 13046, 13048-9, 75C, Norwood; Nos. 13045, 13047, 73C, Hither Green, S.R. Main line diesel-electric No. 10203, 70A, Nine Elms, S.R. Others in various series are under construction; Britannia No. 70045 had been completed at time of writing, for Holyhead. Nos. 75026-9, class 4 4-6-0, had emerged from Swindon.

Among locomotives condemned and withdrawn from stock are 4-6-2 No. 46202 *Princess Anne*, the rebuilt ex-L.M.S. turbomotive severely damaged in the Harrow accident in 1952. Others include a number belonging to older tender or tank classes constructed by various railway companies prior to the grouping of 1923, though four more compound 4-4-0s built to the L.M.S. standard modification of the original Midland design have been taken from stock, numbered 41082, 41084, 41096 and 41115.

#### New Anglo-Irish Timetable

For the first time a comprehensive timetable and handbook is available to travellers, published by British Railways and associated shipping companies.

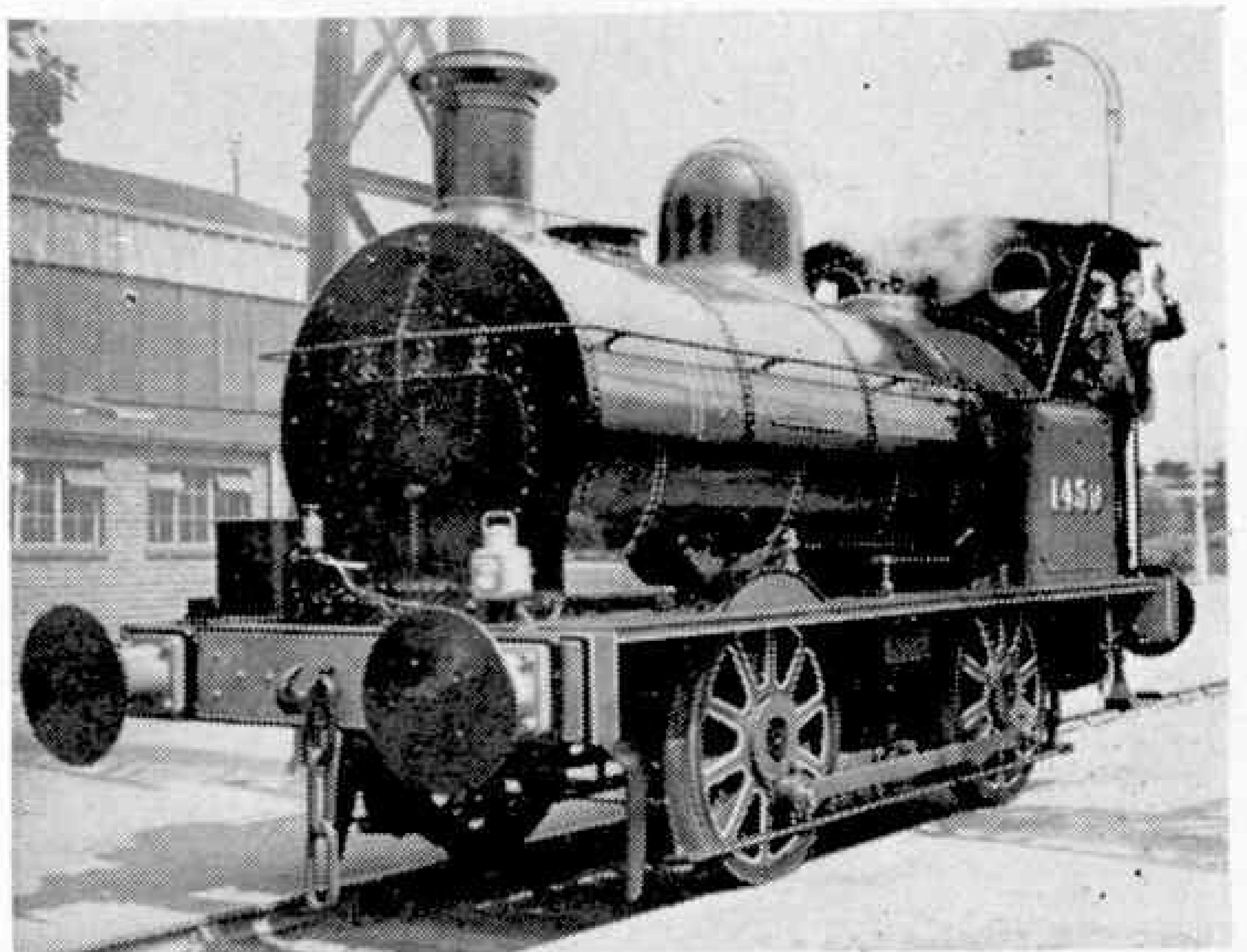
This details times of sailings and connecting trains from selected stations in England and Scotland, as well as corresponding inward services on 14 sea routes serving ports in Northern Ireland and Eire. The book is illustrated, and gives brief details of the various steam and motor-ships usually employed, as well as fares, charges for reserved berths or cabins, for conveyance of cars, cycles, etc., and much other information.

#### Veteran Shunting Engine for Preservation

I was unfortunately unable to accept an invitation to be present at a most interesting and commendable ceremony in Birmingham on 4th June, when what is believed to be the last surviving Ramsbottom locomotive, the 0-4-0 saddle tank engine illustrated on this page, was handed over at the Imperial Chemical Company's Metal Division Works, Witton, Birmingham, to the British Transport Commission for preservation. It had been repainted in the old-time dark green standard on the "North Western" in mid-Victorian days.

This aged little engine was built at Crewe for the L.N.W.R. in 1865. It had been purchased by the I.C.I. from the railway company in 1919 and employed since on regular industrial duty, little altered from original style apart from the provision of a cab—there was no footplate protection in its early years—a more modern chimney and larger buffers, and Ross pop safety valves. The original Crewe number, 1439, has been restored.

These saddle tanks were once familiar at Holyhead, Liverpool and other places. I well remember them at Crewe Works round about 25-30 years ago in L.M.S. ownership.



The Ramsbottom veteran of 1865 recently presented to British Railways for preservation. Photograph by courtesy of Imperial Chemical Industries Limited, for whom the engine worked for many years.

# DINKY NEWS

By **THE TOYMAN**

THE average Dinky Toys collector has an insatiable appetite as far as new models are concerned, and fortunately in recent months there have been plenty to interest all enthusiasts. I have now been in the happy position of being able to describe and picture new models for several months, so that there has been no cause for complaint!

Of course, every collector has at least one favourite subject that he would like to add to his collection. It is not possible to model all the items suggested by readers, but their letters are always welcome, as they are valuable guides to the subjects most in demand. So whenever you have an idea to put forward, write and let me know! I may not be able to adopt your particular suggestion, but I shall be glad to hear from you and all ideas will be carefully considered.

This month once again I have two new models to deal with. These are very

## Real Variety

different in character. They are the Pillar Box, Dinky Toys No. 760, and another representative Army vehicle, the Austin Champ, Dinky Toys No. 674. These two miniatures are certain of an enthusiastic welcome, for they have been asked for repeatedly.

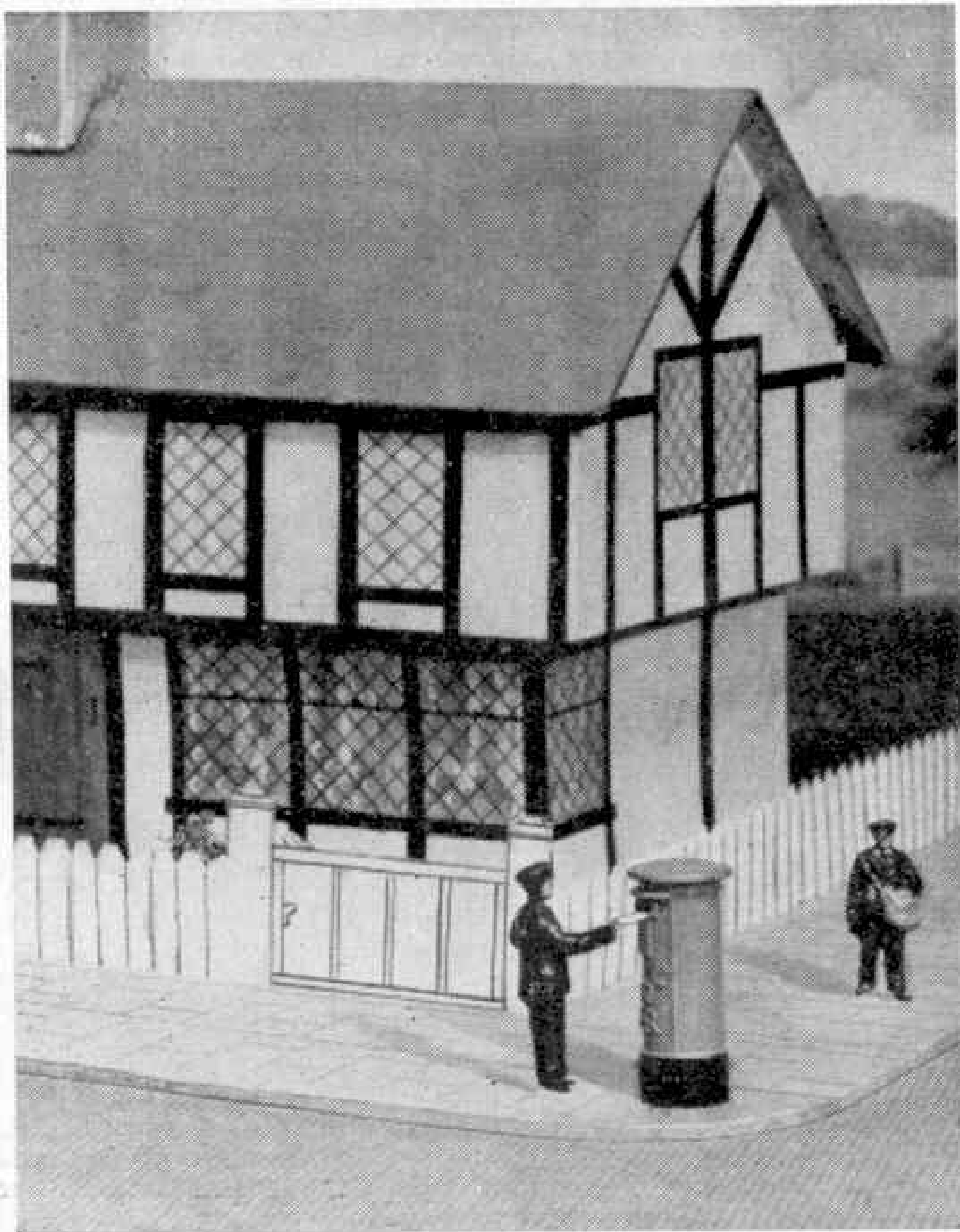
The Pillar Box is a very attractive accessory. Those who live in any Dinky Toys community must have somewhere to post their letters, and anyway the presence of a pillar box will give any busy street the right appearance. So this new Dinky Toy will be a valuable addition to the series. It is modelled on the latest type of G.P.O. Pillar Box, with the EIIR cypher on the door panel, and is finished in the proper Post Office red with a black base.

The Pillar Box is 1½" in height and the illustration at the top of this page gives a good impression of the finely detailed moulding that makes the miniature so attractive. That it is just the thing for a street corner in a layout you will see from my second picture showing the model in a typical setting. The man posting a letter is apparently just in time, for the postman is approaching rapidly to make the last collection!

Next comes a new model of a very different type, but one that I am sure will prove no less popular, especially with those collectors who have asked for more military vehicles. Many readers have told me that they would be glad to see the Jeep reintroduced in the Army series to provide a small, light, personnel carrier. Well, I think these readers will be even more pleased with the latest military vehicle, for it is the British Army counterpart of the Jeep, the Austin Champ.



The new Dinky Toy No. 760, Pillar Box.



The Pillar Box, Dinky Toys No. 760, is just the thing to give the right air to a model street layout.



This fine new model is shown in the pictures on this page, and you can see for yourselves the robust lines and the wealth of detail of the miniature. The latest Army vehicle is finished in service green, and in common with the other models in the series is fitted with Royal Armoured Corps transfers at the front and the rear.



Dinky Toys No. 674, Austin Champ Military Vehicle.

A miniature driver is provided and a spare wheel is carried at the rear, just as on the real thing. The detailed moulding of the casting includes a representation of a spare fuel carrier at the back, and even the pick and spade strapped to the side of the actual vehicle are clearly marked on the model.

The Austin Champ is something of an innovation in British Army vehicles, for instead of having a separate chassis to which the body is bolted, this vehicle employs what is called semi-integral construction. In this arrangement the components that form the various sections of the body are welded to the main frame to form a stout structure that will stand up to any amount of hard use.

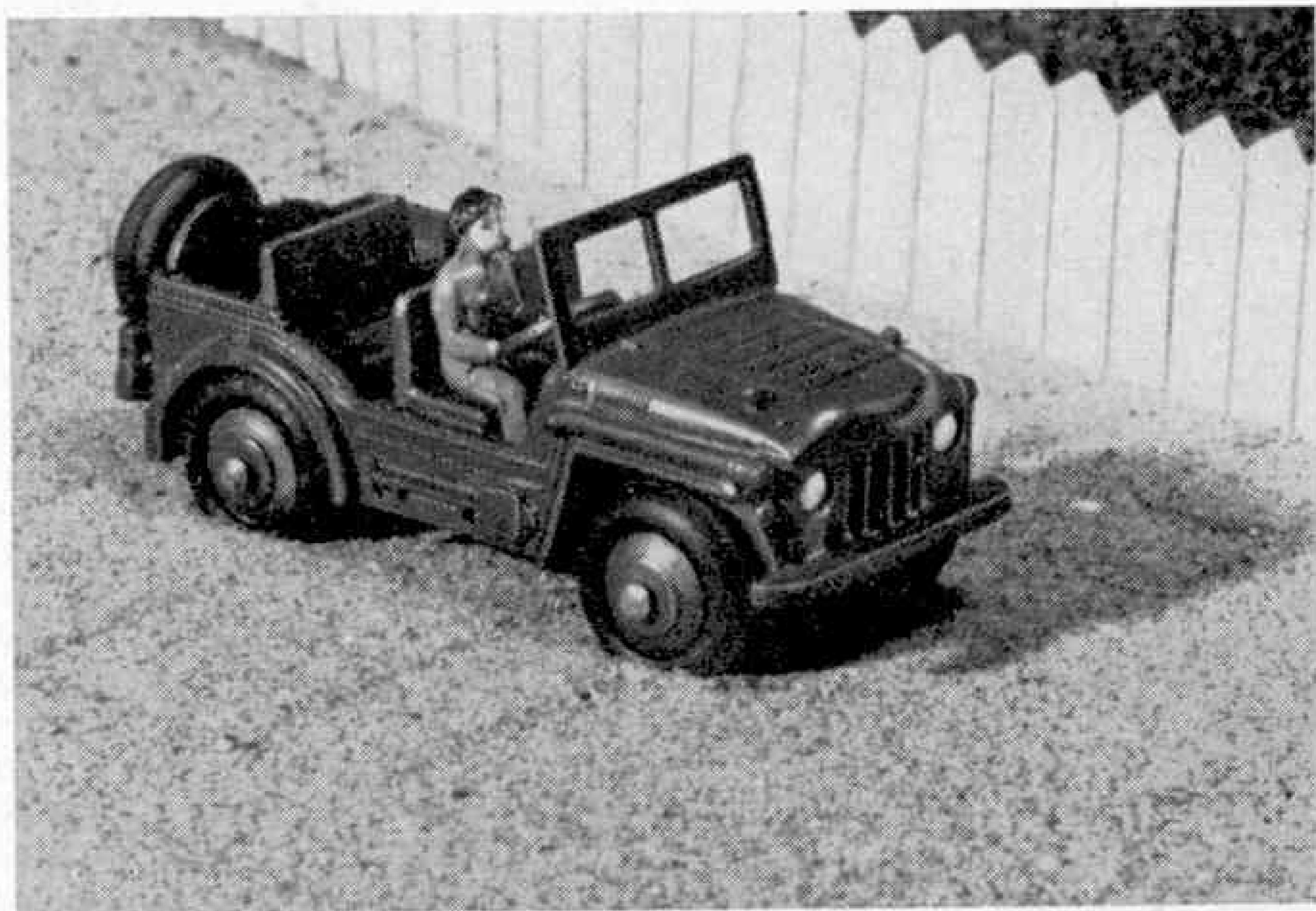
The Champ is indeed an all-purpose vehicle in its military form, and can be driven hard on the

roads or across country. You can therefore use the model in scenes of almost any kind made with your Army collection. Don't forget that streams and even shallow rivers present no obstacles to the real vehicle, for it is waterproofed and by fitting an extension to the air intake it can operate in water up to five feet in depth.

The Austin Champ is an important addition to the range of Dinky Toys military vehicles and every enthusiast will want to add at least one of them to his collection. This type of vehicle is strong, speedy and easily manoeuvrable, and with these assets it is invaluable for army duties of all kinds where a light personnel carrier is needed.

It is an ideal vehicle for use as the personal transport of the Commanding Officer of a Dinky Toys army unit, and no doubt most collectors will find plenty of work for it in this way.

You will notice what a splendid effect is given to the new Dinky Toy by the provision of a driver. This miniature figure gives an authentic touch of realism and really brings the model to life. The many Dinky Toys enthusiasts who have suggested that drivers should be provided for the Army vehicles will be especially pleased by this feature, and will be glad to know that whenever possible in future drivers will be fitted to suitable new models in the Army series.



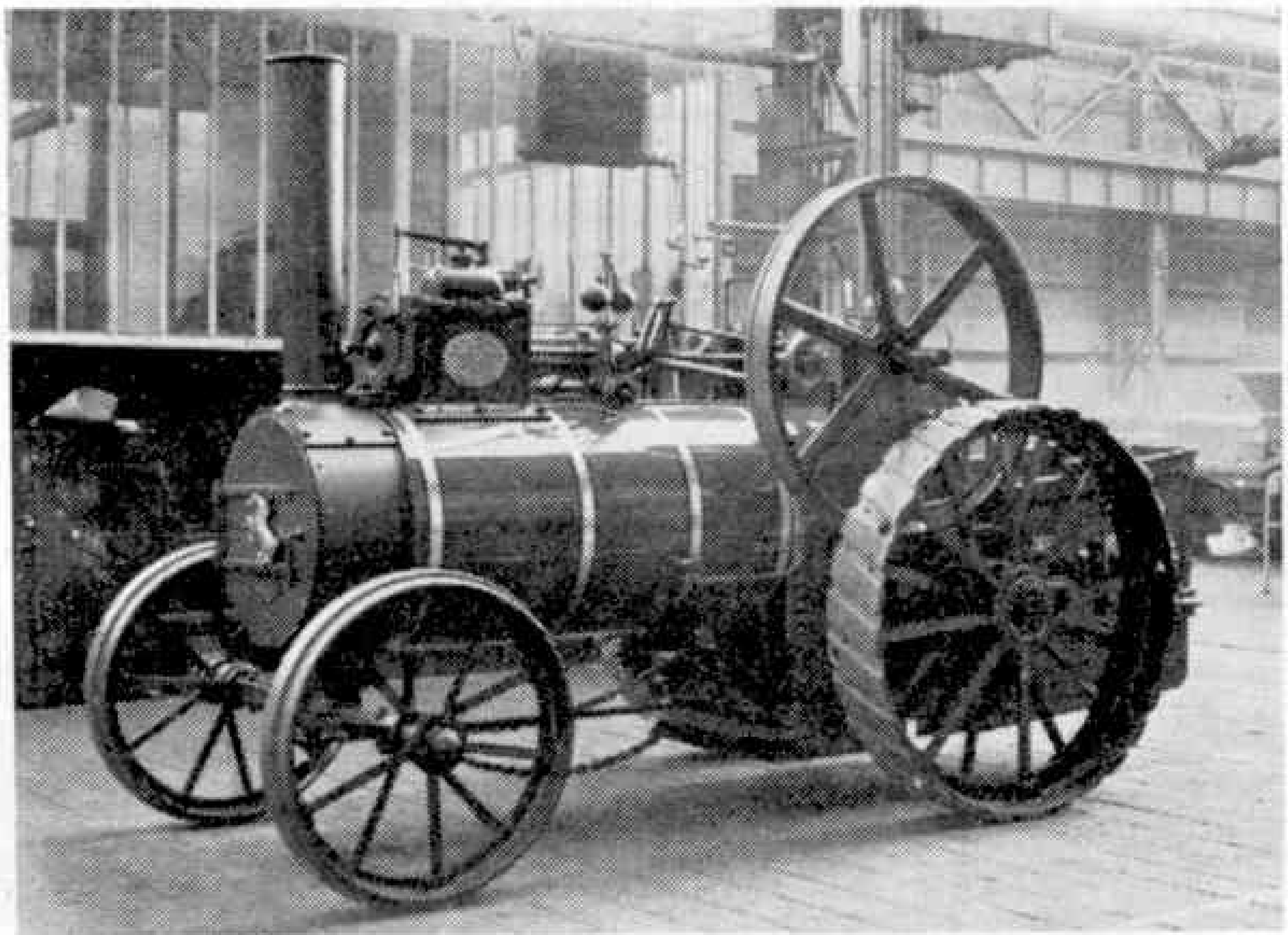
This picture of the Dinky Toys Austin Champ gives a good idea of its sturdy appearance and of the fine detail moulded into the body.

## A Pioneer Traction Engine

HERE is a traction engine that will not end on the scrap heap, but will remain for all interested in these fine old machines to see. In our lower illustration it is shown being secured on a trailer on which it was taken to the South Kensington Museum, for exhibition in the new gallery that is to be opened there later this year. A glance at the pictures shows that it is in splendid condition, although it is well over 80 years old. The explanation is that it has been restored at

the Grantham headquarters of Aveling-Barford Limited, who are the successors of Aveling and Porter, its makers.

This fine old engine was built in 1871, only 11 years after Thomas Aveling, who has been called the father of the traction engine, first introduced this self-propelling power plant to replace the teams of horses previously used for transporting farm steam engines. It has many distinctions in the traction engine world. For instance, it was one of the earliest road locomotives to be steered by its front wheels. Previously models had been steered by a fifth wheel that was placed ahead of the machine, and controlled by a second driver seated in front of the boiler. It is also one of the



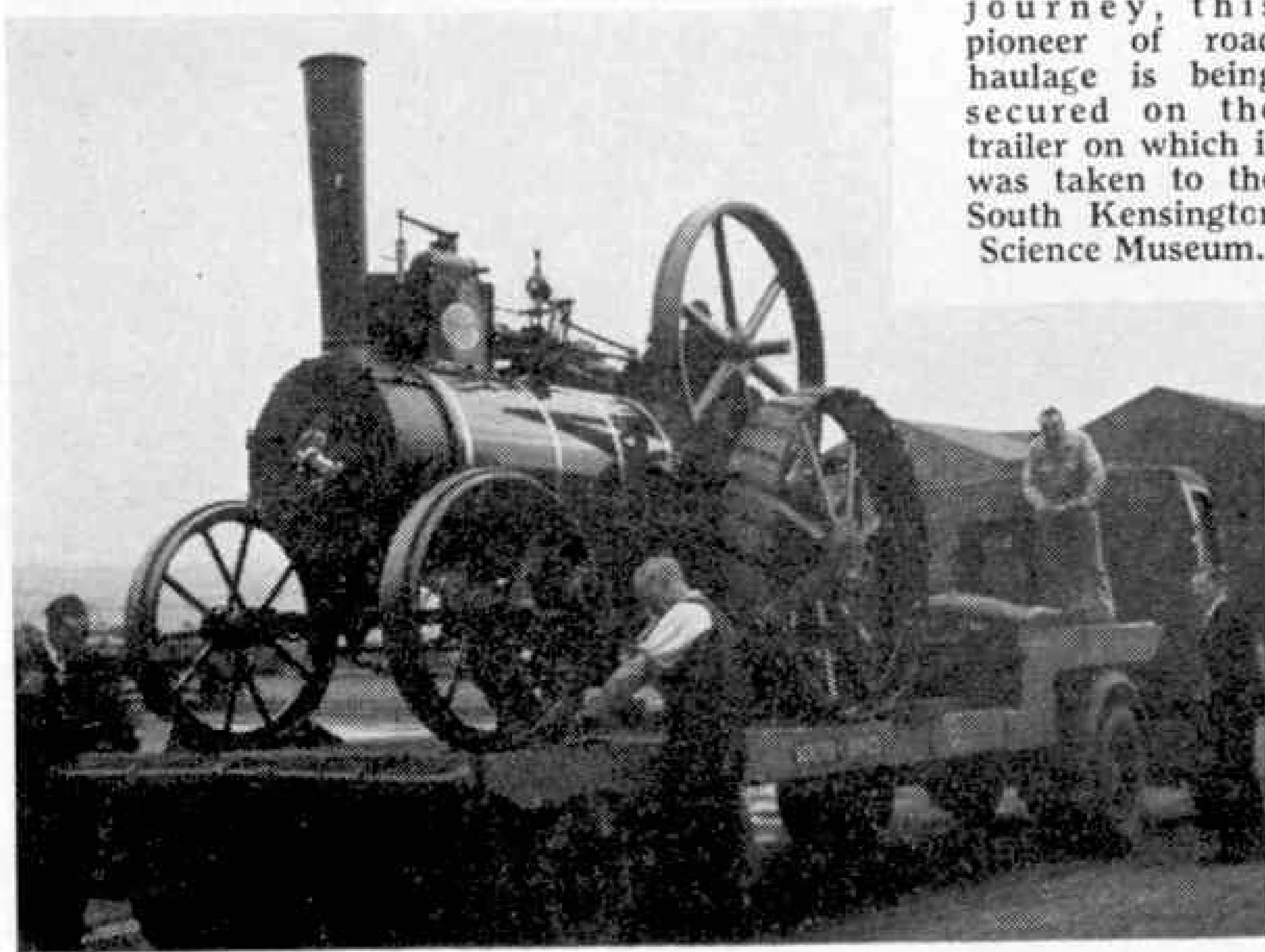
An Aveling and Porter steam road locomotive of 1871 newly restored. Our illustrations are reproduced by courtesy of Aveling-Barford Ltd.

first traction engines in which working parts were mounted on upward extensions of the outside plates of the fire-box instead of on brackets bolted directly to the boiler, a practice that led to leakages, and corrosion of bolt holes, which no amount of skill and care could eliminate. Thomas Aveling patented this system of construction in 1870.

The engine was described as an 8 h.p. machine, but this was nominal, and it is believed that its brake horse power was 28. Its single cylinder had a bore of 9 in. and a stroke of 12 in. A governor was fitted and the tender had a water elevator for filling up from ponds and similar sources.

When the engine left the Rochester works in which it was made, it gave many years' service to its owner, who became so attached to it that eventually he had it reconditioned throughout, regardless of cost. Later it changed hands, and was found by the Road Locomotive Society at Maidstone last year in an advanced state of dilapidation. It is in full working order again and in the Museum it will be a live exhibit—but not in steam, for an electric motor has been provided to drive the principal working parts. It is well worthy of the distinction of being preserved.

Ready for its last journey, this pioneer of road haulage is being secured on the trailer on which it was taken to the South Kensington Science Museum.





# From Our Readers

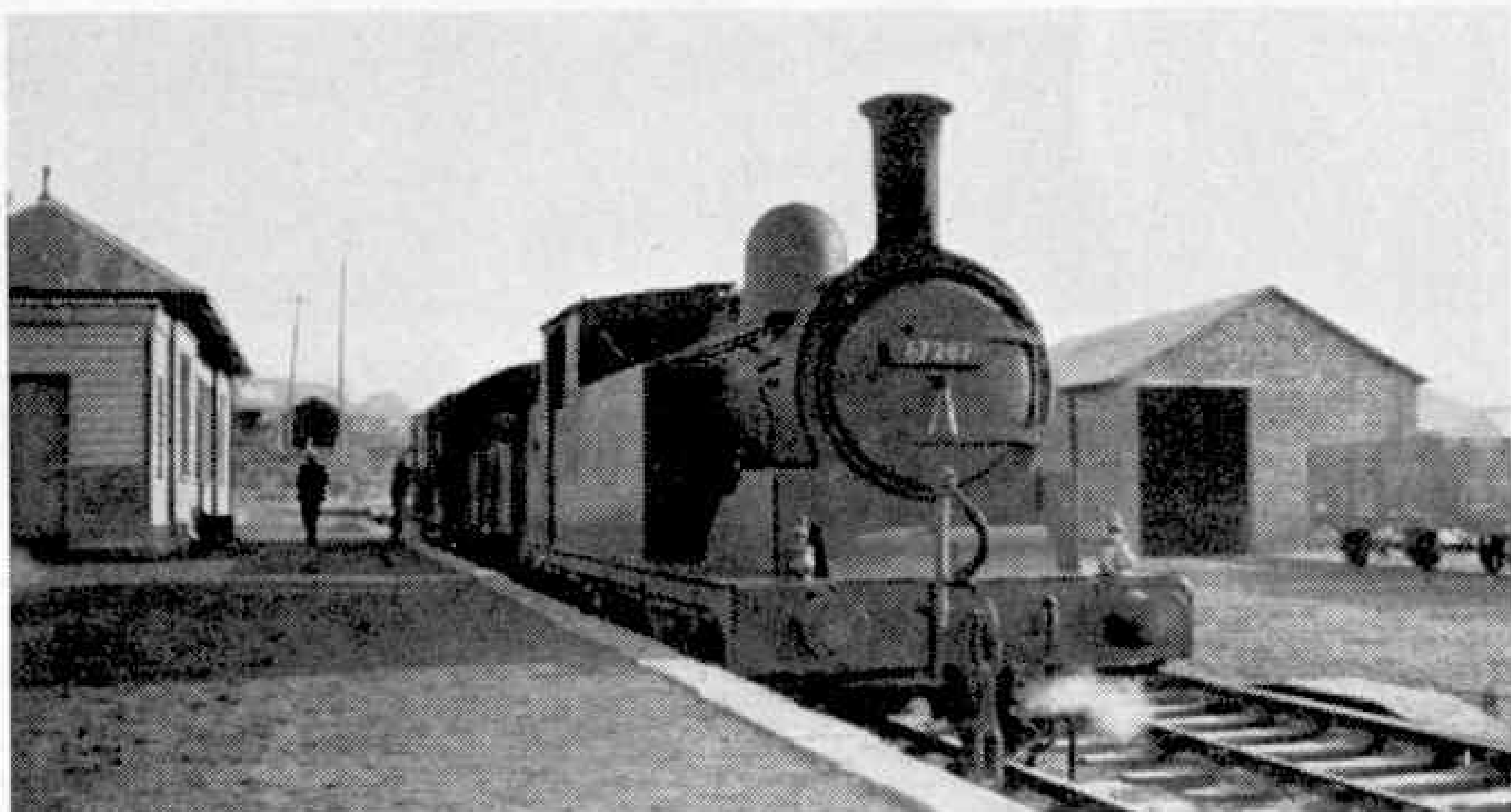
*This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.*

## THE INVERURIE-OLD MELDRUM BRANCH

The branch line running north-east from Inverurie to Old Meldrum, Aberdeenshire, is 5½ miles in length, and was formerly owned by the Great North of Scotland Railway. It is single track throughout the whole of its length.

Lethenty is the only intermediate station. This is rather picturesque, as it is surrounded by trees. It has one platform, part of which is built over a bridge under which flows the Lochter Burn, and there are two sidings, reached by a trailing crossover, which serve Lethenty meal mill. The wagons pass to the mill by means of a turntable, which sets them on an adjacent siding. The next level crossing is at Fingask where at one time there was a station.

On the wall of the station there still remains a



The 11 a.m. goods train at Old Meldrum, waiting to return to Inverurie. The engine was carrying out its last service before breaking up. Photograph by R. B. Sangster.

Great North of Scotland "Warning to Trespassers" notice board, dated 1st October 1909. The passenger service was withdrawn on 2nd November 1932. The engine of the train was known as *Meldie Meg* locally, and it had a resplendent brass dome.

Nearly half a century ago a traction engine dropped on to the line at Portstown, midway between Inverurie and Lethenty, falling through a wooden bridge on top of the engine *Glen Grant*, built in 1851, completely wrecking it.

There is now only one goods train per day, with an ex G.N.S.R. brake van built in 1920. Motive power is usually provided by one of the few F.4 2-4-2Ts or by a J.72, J.35, J.36, J.37 or J.38, running in on the branch line after repair at Inverurie Locomotive Works. Sometimes an ex L.M.S. 2 P 0-4-4T is used, and in the accompanying illustration an ex-N.E.R. 0-4-4T is seen at the head of the train.

R. BEATH SANGSTER (Inverurie).

## SWALLOWS AND STEPPING STONES

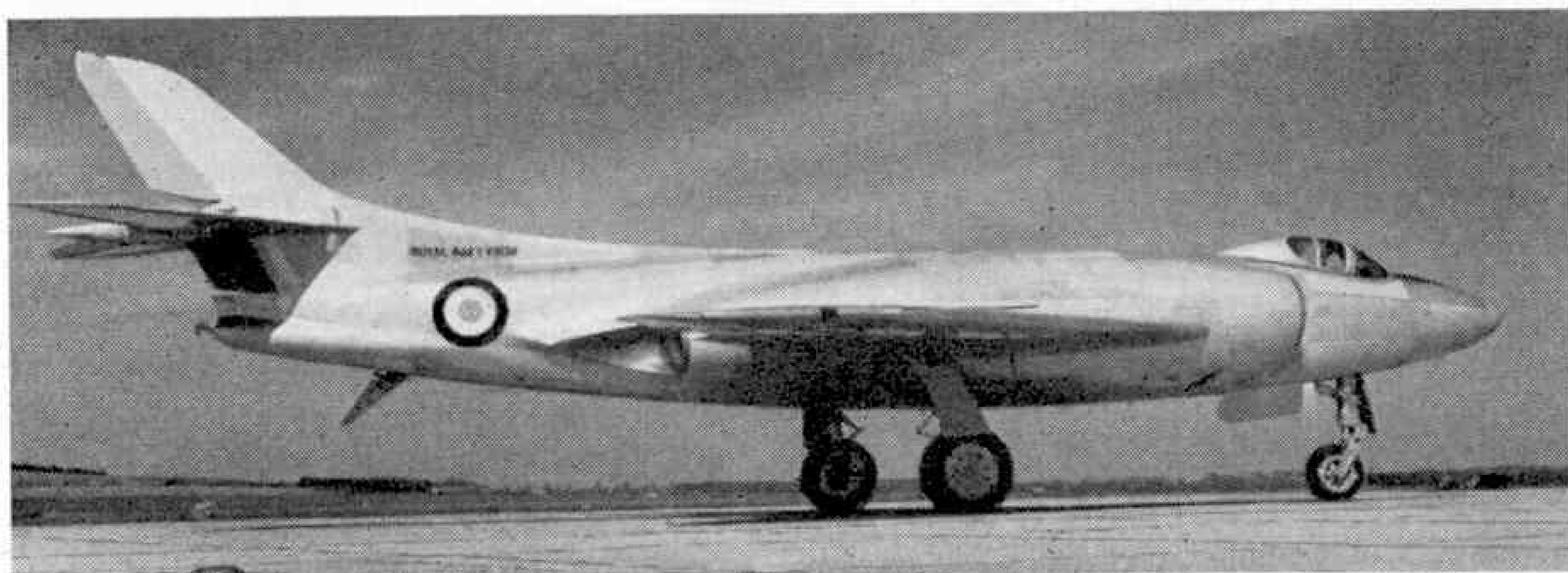
Where the River Mole runs beneath Box Hill in Surrey lie the Stepping Stones at the centre of a famous beauty spot. Anglers sit on each bank under the spreading chestnut trees, waiting for bites from the elusive fish that dart about among the large stones. At this point too, the Pilgrims' Way crosses the river, and long before the stones were placed in their present position the pilgrims used to ford the Mole here with their horses.

Farther down the Mole, towards Leatherhead, the river runs underground. There are many legends concerning this, and it is also mentioned by Pope and Milton in their poems. Where the river bed is absorbent the Mole "digs" the underground tunnel, for in very hot weather the water is able to seep through the earth, and runs for about two miles underground. This is called the "Swallows", the water being swallowed up by the earth. The name of the Mole does not come from these burrowing habits, however. It is derived from *mola*, the Latin name for a mill. There are many mills on this river.

This district is also famous for its interest to botanists and entomologists, as a preserve of the original vegetation native to the chalk, the home of rare flowers and insects. BEVIS HILLIER (South Merstham).



Crossing the Mole at the Stepping Stones. Photograph by B. Hillier.



## Air News

By John W. R. Taylor

### New Naval Jet

The Supermarine 525 sweptwing jet fighter, illustrated above, made its first flight on 6th May last. It has been described as the fastest and most powerful aircraft ever designed to operate from aircraft carriers. No details are available, except that it is a single-seater, powered by two Rolls-Royce Avon turbojets.

It is about a year since the Admiralty announced that they had ordered a substantial number of twin-jet sweptwing fighters developed from the Supermarine 508, which had "straight" wings and a "butterfly" V-tail. The new Type 525 is not the final production version, but almost certainly gives a good impression of what the Royal Navy's new fighter will look like.

### Pennyfarthing Flies to France

To celebrate the 80th anniversary of the first crossing of the English Channel by a British cyclist, Alfred Nuttall of Leeds travelled to France recently with his pennyfarthing bicycle. But whereas his predecessor went by boat, Mr. Nuttall crossed the easy way, by Silver City Air Ferry.

Dressed in the style of the 1870s, he mounted his 5 ft. high machine at Ashford in Kent, cycled nine miles to Lympne Airport and made the 20 min. air crossing. After a 40-mile ride to the scene of the Battle of Agincourt, he flew back to England.

### Flight Refuelling News

The U.S.A.F. have placed an order for nearly £6,000,000 worth of mid-air refuelling equipment with Flight Refuelling Inc., the American subsidiary of Sir Alan Cobham's Flight Refuelling Ltd. The British Air Ministry too is showing renewed interest in the technique, and has supported recent tests in which a Valiant bomber has been refuelled in flight

The Supermarine 525 sweptwing jet fighter, which made its first flight on 6th May last, piloted by Lt. Cmdr. M. J. Lithgow. Photograph by courtesy of Vickers-Armstrongs Ltd.

by a Canberra tanker. Later, tests may be made with the other British "V" bombers, the Victor and Vulcan, to increase still further their already exceptional range and bomb load.

Main problem is to increase the speed and height at which the operation can be carried out. At present, the best achieved in Britain is 310 m.p.h. at 32,000 ft., but tests have been made in America at about 460 m.p.h., which is equivalent to 70 per cent. of the speed of sound at 35,000 ft.

### More Super Connies at London

More and more of the new and longer Lockheed Model 1049 Super Constellation air liners are beginning to call at London Airport. The first ones, in the insignia of K.L.M. and Air France, were seen several months ago. Now Trans-Canada Air Lines and Air-India International have both begun services linking their homelands to Britain with "Super Connies".

One of the passengers on the first T.C.A. service was Mr. J. A. D. McCurdy, who was officially the first man in the British Empire to fly a heavier-than-air machine. The date was 1909, the place Nova Scotia, and the aircraft his own *Silver Dart*, which completed well over 200 successful flights in America and Canada.

\* \* \*

Two, or perhaps three, Vickers Viscount turboprop air liners may be bought soon to replace the veteran piston-engined Vikings of the Queen's Flight, which have been in service for nearly eight years. They will cost about £300,000 each.

\* \* \*

This year, for the first time, the airlines are earning more money than railways in the United States. It is air travel's second major record in successive years, for during 1953 more people crossed the Atlantic by air than by steamship.



Trans-Canada Air Lines' first Lockheed 1049 Super Constellation taxiing on the tarmac at London Airport.





### Viking No. 10 Fired

The tenth Viking research rocket was launched successfully at White Sands Proving Ground, New Mexico, on 7th May, and equalled the 136-mile high altitude record for single-stage rockets set up previously by Vikings 7 and 9. Like its predecessors, it was designed and built by The Glenn L. Martin Company for the U.S. Navy, to obtain data on cosmic rays, composition of the atmosphere, radio waves, photography and spectroscopy at altitudes previously beyond the reach of scientific research. Its power plant was a 20,000 lb. thrust Reaction Motors rocket.

At the point on its ascent when its fuel supply of liquid oxygen and ethyl alcohol was exhausted, the  $7\frac{1}{2}$  ton, 42 ft. long rocket was travelling at a speed of 4,000 m.p.h. Telemetering equipment inside its sleek shell radioed data on performance and atmospheric conditions back to ground stations, where it was recorded while the rocket journeyed through space. Later, as the Viking fell back to earth, its nose section, containing cameras and instruments, was blown off by explosives and lowered to the ground by parachute.

(On 24th May Viking No. 11 reached 158 miles).

The F3H-1N, the night fighter version of the McDonnell Demon single-seat jet fighter. Photograph by courtesy of McDonnell Aircraft Corporation, U.S.A.



U.S. Navy Viking No. 10 rocket being prepared for launching at White Sands Proving Ground, Las Cruces, New Mexico. Photograph by courtesy of The Glenn L. Martin Company, U.S.A.

### Viscounts to Dublin

All Aer Lingus day services between London and Dublin, including the popular "Dawnflights", are now operated with the airline's fleet of four Viscount 707 turboprop air liners. They have cut the flying time on the route by 40 min., to only 1 hr. 20 min. The cheap-fare "Starflight" night services are still flown with DC-3 Dakotas.

### McDonnell's Demon

The McDonnell F3H Demon is big in every way for a single-seat, single-engined fighter. Its wing span is a moderate 35 ft. 4 in., but its fuselage is 59 ft. long and houses some 1,000 gall. of fuel in addition to the pilot, a 10,500 lb. thrust Westinghouse J-40 turbojet, radio, radar and guns. Versions now coming into service are the F3H-1 day fighter and F3H-1N night fighter, which is illustrated on this page.

Able to fly faster than sound, the Demon is also said to be the world's most heavily-armed carrier fighter, as it can carry 36 rockets under the swept wings, in addition to four 20 mm. guns in a weapon bay under the cockpit. Huge wing slots and flaps are fitted to improve controllability at low speeds, and it can be identified easily by its unique "beaver tail" rear fuselage.

Only 60 Demons will be delivered with J-40 engines. Later models will have the 14,000 lb. thrust Allison J-71-A-2.

### How to save \$1,000,000

The American Post Office Department has been experimenting with nylon bags for carrying air mail. They weigh  $6\frac{1}{2}$  oz. less than the cotton bags normally used, which may not sound a lot; but so many bags are flown so many miles that the weight difference in the lighter bag alone would save \$1,000,000 a year. Further savings can be made by using paper snap collars instead of leather ones, and new address label holders made of lightweight aluminium alloy. What is more, the holders are said to provide a more legible address and so reduce losses caused by misdirected mail.

### Change of Name

Percival Aircraft Ltd., have changed their name to Hunting Percival Aircraft Ltd., to identify themselves more closely with the Hunting Group of companies, to which they belong. Their present production aircraft include the Provost primary trainer and Pembroke general purpose transport, and they are developing a 10-seat jet helicopter and a jet-powered version of the Provost.

# Powerhouse Deep in a Mountain

## A Great Canadian Hydro-Electric Scheme

By Frank Illingworth

**I**N a mountainous, glacier-scarred corner of Northern British Columbia engineers have recently put the finishing touches to an industrial undertaking of breathtaking proportions—Project Kitimat, the creation of a new major aluminium industry in the heart of a little-known wilderness.

Back through history to before the first man arrived in this "Red Indian country", the Kitimat region had one main value—the beaver that arrowed up its rivers. But things have changed. Men like taciturn

Niagara Falls, and it's designed to turn out aluminium to the tune of nearly 70 per cent. of the total output of the whole of the United States.

Why locate a major industry on an almost uninhabited coast, subject to ferociously cold and foggy winter weather and 430 miles from the nearest city, Vancouver?

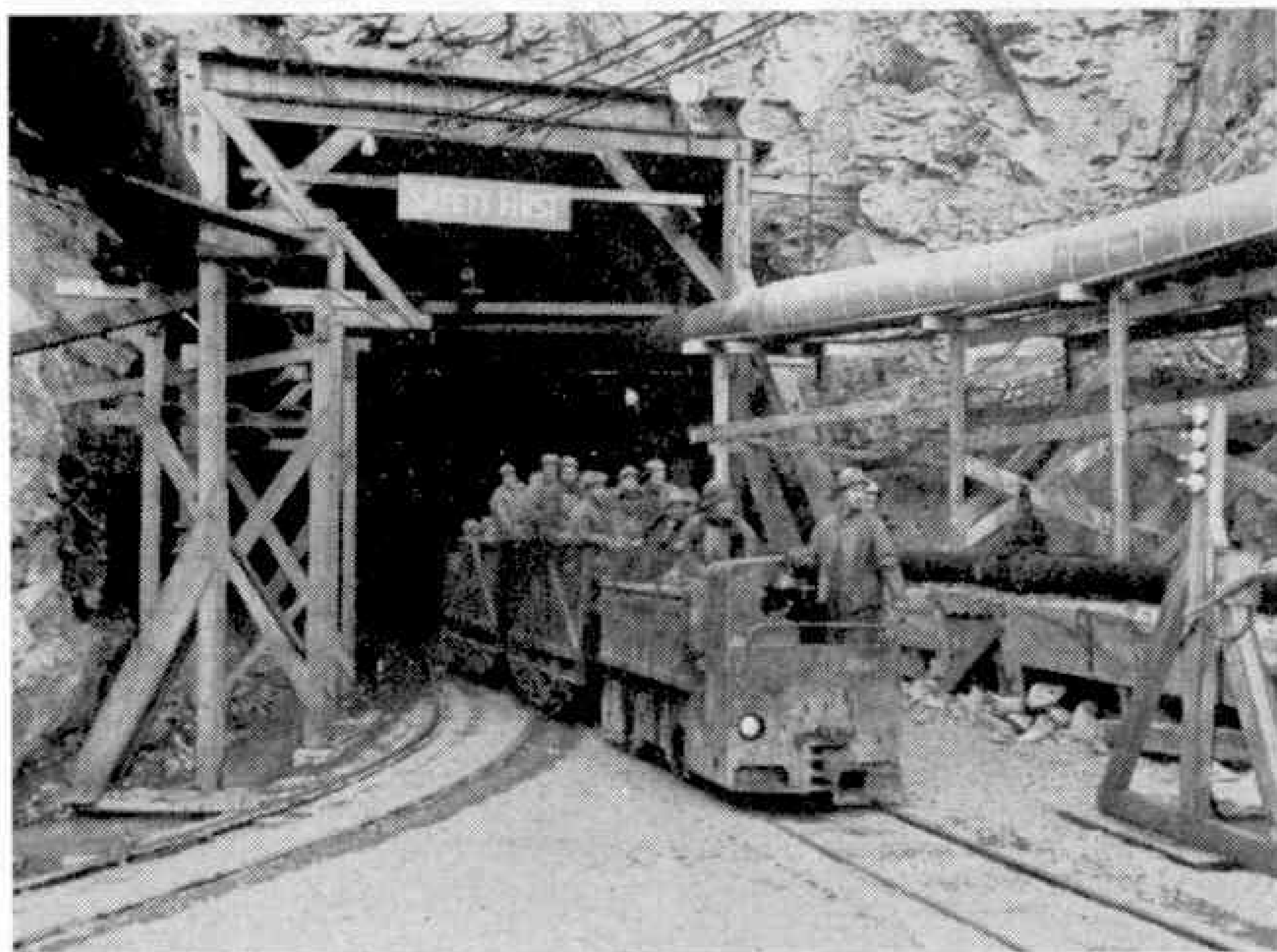
The answer is that the electricity needed to make one ton of aluminium would be more than enough to run the average home

for ten years. Above all, manufacturing processes like that of aluminium depend on cheap electricity, and when the Aluminium Company of Canada made its needs known the minds of Canada's hydraulic engineers went back to 1928—to the day when an obscure member of British Columbia's Department of Lands and Forests named Knewstubb announced the discovery of "one of the world's greatest sites of hydro-electric power".

This phrase conjures up mighty plummeting Niagaras. But what William Knewstubb had found was not a

waterfall or cataract but a chain of five great lakes—Ootsa, Eutsuk, Tahtsa, Tetachuk and Whitesail. Linked by underground spurs, they fed the Nechako River, which flowed the length of England eastward into the mighty Frazer River. More important, Knewstubb noticed that the Nechako was teetering between flowing east or west, that it would require only a small dam to reverse it and that if a tunnel were drilled from Lake Tahtsa through the Coast Range it would provide the waters of Nechako and the five great lakes it links with a drop of 2,580 feet!

The Knewstubb Plan came to nothing—then. But since World War II the demand for aluminium had steadily exceeded



The afternoon shift entering an adit of the twin 10-mile bores of the Kemano Tunnel, driven through the Coast Range of British Columbia.

Trapper Tom Taerum point at the Nechako River and say "Last year she flowed eastwards. Now she flows westwards, and instead of running a trapline I'm hose repairman on one of the biggest power projects on Earth".

The plan was to "deliver the waters of this part of the Coast Mountains in one overwhelming wham on the west side, above the Indian village of Kitimat. The size of the wham? Well!" Tom Taerum arches his eyebrows: One million six hundred and fifty thousand horse power. The drop of the water at the Grand Coulee dam, monarch of power sites in the United States, is only 350 feet. Kitimat's head will be sixteen times as high as



output, and six years ago the Aluminium Company of Canada decided to double its annual output and to centre its great new drive on Kitimat.

Project Kitimat covers such a huge area that the supervising engineers travelled between the construction sites by helicopter. And the plan itself involved not only damming a major river and reversing its flow, but also boring two ten-mile tunnels through the ragged, snowy Coast Range from the most westerly of the chain of lakes, a placid stretch of water exceeding 330 square miles, and building a major powerhouse deep in the mountain.

It is not generally known that more than 75 underground power plants have been or are being built over the world. That deep in the Coast Range will, when completed, have sixteen vertical single-runner four-nozzle impulse turbines, each rated at 140,000 to 150,000 h.p. at 327 r.p.m.; and space requirements necessitate blasting from the mountain a chamber more than 1,000 feet long, 135 feet high and 80 feet wide . . . the biggest mid-mountain power chamber anywhere in the world.

And the construction of the remarkable powerhouse was not necessarily the most difficult part of Project Kitimat. A major

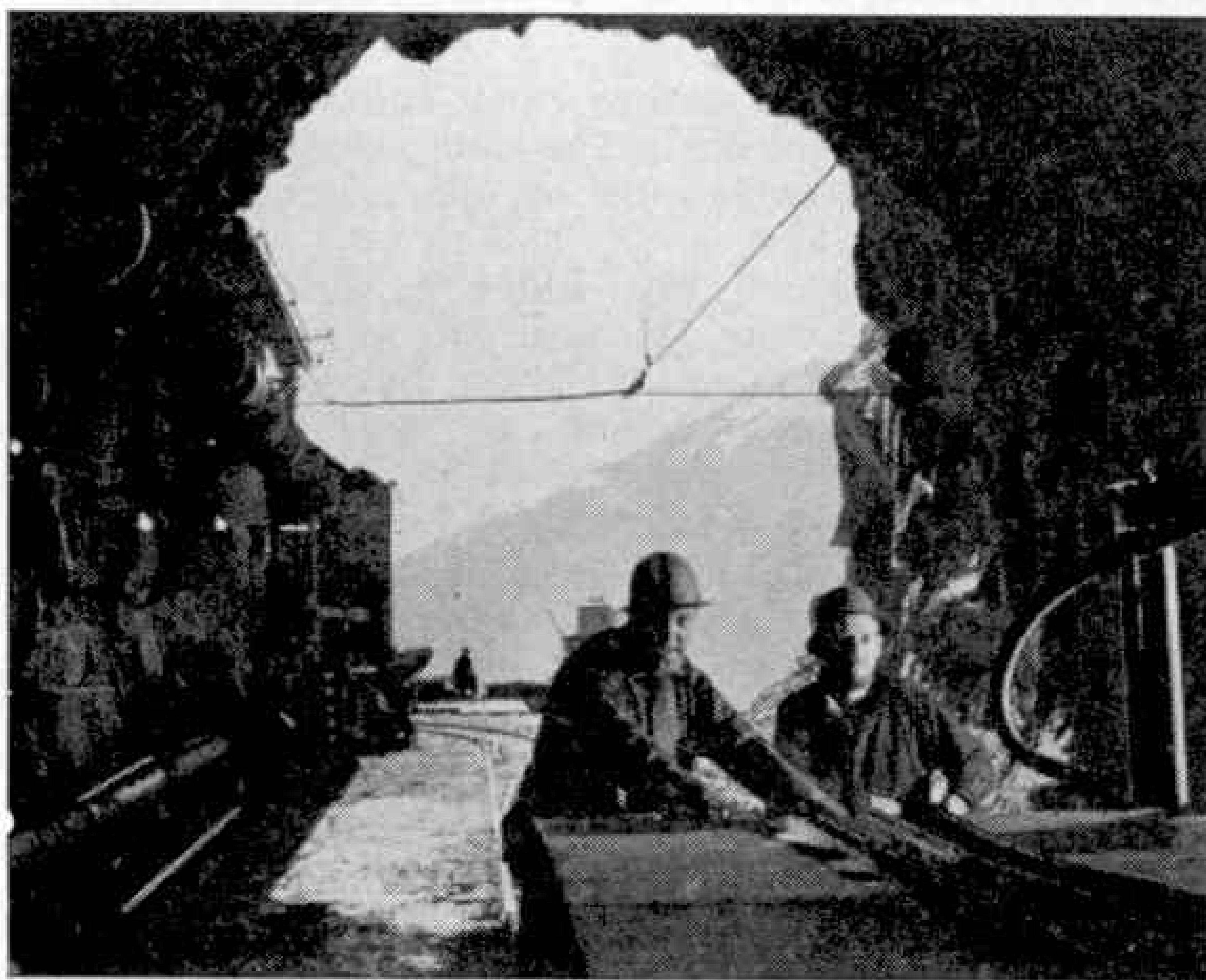


A tractor and trailer bringing heavy supplies for a construction camp of the Kitimat Power scheme.

aluminium manufacturing city had to be built on the steep sides of the inlet known as Gardner Canal, and a port large enough to handle more than half-a-million tons of aluminium annually and a great deal more bauxite. A new network of roads had to be built through incredibly rough country, power cables erected across fifty miles of mountains, airstrips built—and the work had to be done in summer temperatures up around the ninety mark and in winter temperatures of sometimes around *fifty below zero*.

All the more remarkable is it that Operation Kitimat was to grind into stride this summer—right on schedule. Field parties of surveyors and engineers were landed at Kitimat in the summer of 1948, and almost immediately they saw that William Knewstubb had been right. Hidden in the five lakes flowing into the Nechako River was a colossal force, and for three years they worked along the trails and valleys which up to then had felt nothing heavier than the tread of Indian moccasins, travelling a distance of more than half-way round the world, much of it on snowshoes and skis.

By 1951 the blueprint for Project Kitimat was completed, and the first of thousands of tons of heavy equipment were



Water from the Nechako River, east of the Coast Range, will flow through the Kemano Tunnels to feed the turbines in an underground powerhouse.

being delivered to key points by air, dog-team, horsepack and by boat. Early in 1952 engineers struck out into the bush in frigid weather to place the first dynamite charges. By midsummer 6,000 men and several hundred of the heaviest mechanical shovels, scoops and drills were translating the blueprint into fact.

A clay dam began to sprawl across the Nechako River. Batteries of drills went to work at the western extremity of Lake Tahtsa, cutting into the Coast Mountains two tunnels 25 feet in diameter.

In a few months the two tunnels had been driven right through the mountains to the sheer cliffs of Gardner Canal, and a power chamber nearly 1,000 feet long had been hacked out mid-way along them and electrical engineers were installing machinery.

A powerhouse inside a mountain has obvious advantages over the above-ground variety. It is invulnerable to aerial attack, and its machinery is anchored and cannot vibrate. But there was one great disadvantage in the plan for Project Kitimat. The aluminium plant at Kitimat and the Kemano power station would be separated by the Kildala Pass, a ridge of rock 5,300 feet high and spanned by glaciers and torrents. To get the power from the station to the bauxite smelter entailed spanning this fearsome ridge with 2½-inch aluminium cables with a reinforced steel core. The cables would be the largest of their kind ever made, and several kinds of tower were built on rock outcrops rising from the snows before the engineers decided they had a design that would withstand the terrible strain of winter winds.

The only way to supply the men working on the transmission line was by helicopter. Marmots sit in their burrows, whistling; you hear the occasional rattle of a bear's claws on rock and the slapping of a beaver's tail; and in winter winds of 100 m.p.h. and cold such that it freezes the moisture on the human eyeball are nothing uncommon. But in spite of the difficulties the 48 miles of cable were erected on schedule; and meanwhile the world's largest bauxite

smelter was being built at Kitimat, and Kitimat itself was taking shape—the shape of a town with an ultimate accommodation for 50,000 people, and a harbour.

When work on the Project first started Blackie Thomas, a man with steady eyes, angular face and hams for hands, said: "We have less'n two years to complete it, but we'll do the job on time". They did.

The order in February 1952 was to finish the road to the Nechako damsite before thaw, for otherwise it would not be possible to get the dam-building machinery into



Setting up for drilling in one of the tunnels of the Kitimat project.

position before early summer. The order was fulfilled. The dam across the Nechako was completed by the end of the second summer.

Speed! Pay bulldozer drivers and pile operators £40 and £50 a week to get the work done. For the first consignment of alumina, which is the semi-processed bauxite ore, arrives at the new docks at Kitimat from British Guiana this summer. About the same time the Nechako River will be reversed, and a torrent will roar through a mountain, set the turbines deep in its heart throbbing and 300,000 h.p. of power surging along the new high tension cables to the new furnaces at Kitimat. The date? The man in charge of the whole operation, "Old" Strandberg, nods with satisfaction: "Mid-summer's the answer; an' we're sure up to schedule." And the scheme is being inaugurated by the Duke of Edinburgh during his Canadian tour.



# A Novel "Short Story" Contest

HERE is a fascinating and amusing summertime competition in which every reader of the *M.M.* can take part. It is not necessary to possess a Meccano Outfit to be eligible for the Contest, and there is no model-building to do. A range of fine prizes is offered, and readers of any age are invited to send in entries.

Competitors are asked simply to write on a postcard a short humorous story incorporating the names of as many Meccano parts as possible, or terms used in connection with Meccano model-building.

There are many Meccano parts with names that can easily be incorporated in amusing stories of this kind, and it is great fun to try one's skill in weaving a yarn around them. Each story submitted must be between 50 and 200 words in length, and it should be the competitor's aim to make his entry as humorous as possible, for the more amusing a story is, the greater will be its chance of a prize.

The prizes to be awarded for the most interesting and humorous entries are: First, Cheque for £2/2/-; Second, Cheque for £1/1/-; Third, Postal Order for 10/6. There will be also five prizes each of 5/-.

Entries should be addressed "Meccano Short Story Competition, Meccano Ltd., Binns Road, Liverpool 13." Closing date for entries, 30th September, 1954.

## MODEL-BUILDING COMPETITION RESULTS

### "Winter" Contest (Sections A and B)

The complete lists of prizewinners in each Section of the "Winter" Model-Building Competition were as follows. Each prizewinner has already been notified by letter.

#### Section A (for competitors under 14 years of age).

First Prize, Cheque for £4/4/-: D. Bretten, King's Lynn. Second Prize, Cheque for £2/2/-: C. J. Phillips, Carlisle. Third Prize, Cheque for £1/1/-: R. J. Hall, Claremont, South Africa.

Ten Prizes each of 10/-: P. Lauder, Bath; K. Cleare, Chichester; A. R. Patterson, Chester-le-Street; D. B. Gravatt, London N.W.4; K. J. van Zwieten, Alphen Run, Holland; P. Pomeroy, Jersey; S. Carter, Wallington; R. J. Stent, Pietermaritzburg, South Africa; M. A. Rhoades, Hull; R. N. Griffiths, Ruislip.

Ten Prizes each of 5/-: T. Caudrey, Kroonstad, South Africa; J. Loveridge, Shrewsbury; D. Gaff,



David Bretten, King's Lynn, photographed with the fine model tractor for which he was awarded First Prize in Section A of the "Winter" Model-Building Competition.

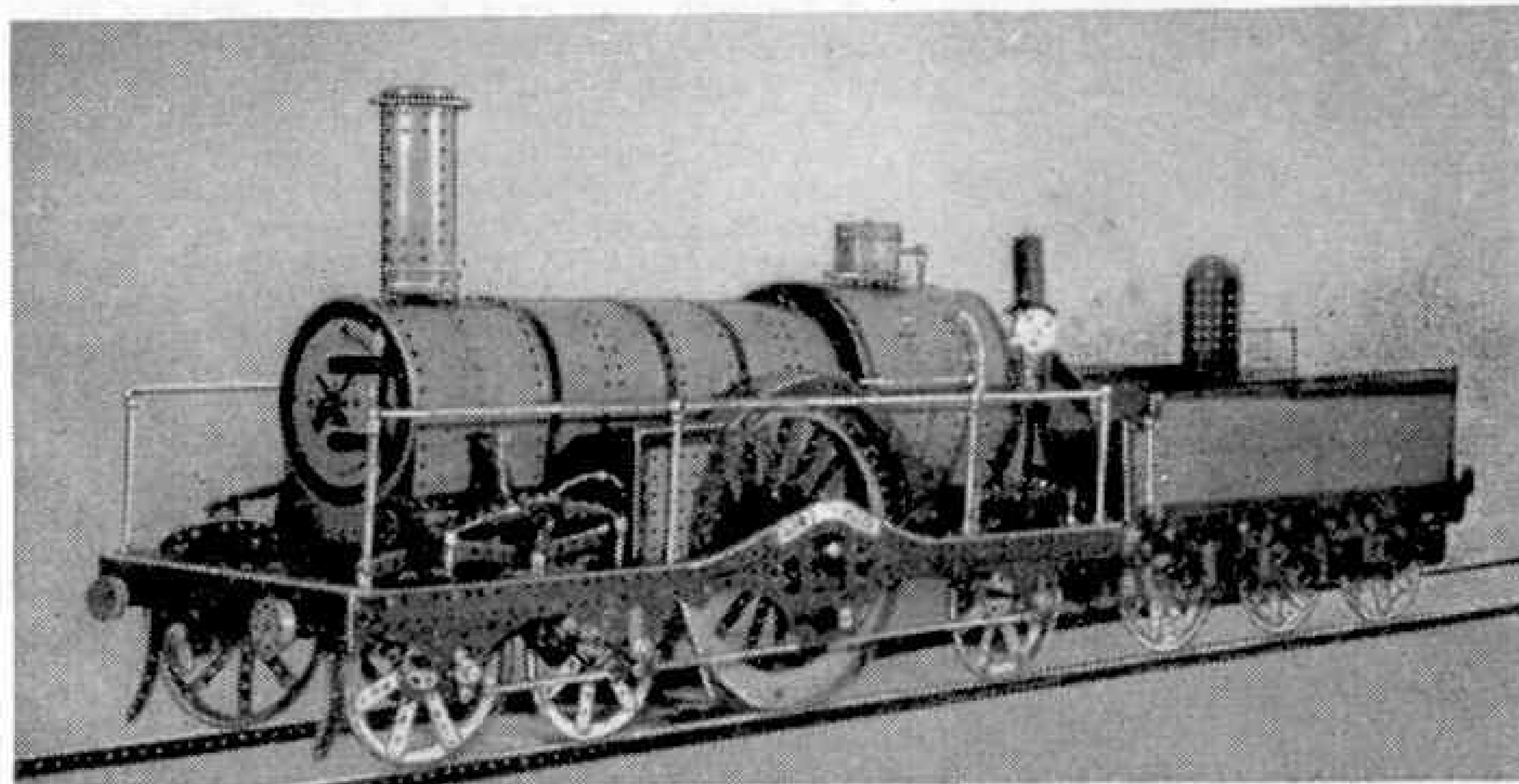
Guildford; M. Westwood, Weybridge; G. R. Moore, Lowestoft; D. A. Lock, Sevenoaks; D. Moffatt, Carricknacross; J. Botha, Uitenhage, South Africa; C. E. Weeden, Welwyn Garden City; F. Pitt, Fareham.

#### Section B (for competitors over 14 years of age).

First Prize, Cheque for £4/4/-: J. G. White, Fishpool. Second Prize, Cheque for £2/2/-: S. Allan Stinson, Kingston, Canada. Third Prize, Cheque for £1/1/-: M. Rogers, Maidenhead.

Ten Prizes each of 10/-: C. E. Wrayford, Bovey Tracey; B. W. Rowe, Buckfastleigh; J. P. Houbert, Geneva, Switzerland; P. Saunders, Riccarton, S.W.1, New Zealand; W. H. Stewart, Edinburgh 6; J. J. van der Wal, Amsterdam, Holland; H. H. Taylor, Huddersfield; R. Pitches, Beckenham; D. Angela, Liphook; H. W. Henry, Rochester.

Ten Prizes each of 5/-: Wm. J. E. Gomme, Swansea, Canada; M. K. Douglas, Peterhead; D. C. Mead, Kidsgrove; G. W. A. Fogarty, Portadown; J. Blackburn, Littleborough; M. R. Ruchmere, Salcombe; D. O. Harfitt, Shirley; N. Uffindell, Beckenham; F. Coldman, Pawla, Malta; J. S. N. Elvey, Haywards Heath.



A fine model of the former G.W.R. broad gauge locomotive "Lord of the Isles." It is the work of B. W. Rowe, Buckfastleigh, and won a prize in the "Winter" Model-Building Competition.



Christopher Jones, Rugeley, a keen young Meccanoite whose work has already brought him success in Meccano Competitions.

# Among the Model-Builders

By "Spanner"

## A SPACE SHIP IN THEIR DRAWING ROOM

Two Gravesend boys, eight year old Richard Hankin and his seven year old brother Edward, have in the drawing room of their home what is probably the dream of every modern boy—a "space ship," built

by their father. This "rocket driven space ship" is five feet high by one foot in diameter, and can do practically everything, apart from actually taking off. The ship itself and its launching structure are built from Meccano and in the accompanying illustration is shown also the elaborate electrical apparatus.

The rocket ship stands upright on a realistic launching platform and incorporates eight electric motors, which provide many impressive effects. These include a lift to take the "crew" to the cabins, the doors of which slide open at the turn of a switch on the control panel. Inside the "stabiliser compartment" of the ship, miniature spacemen are grouped in front of a radar screen, upon which a

light blinks to coincide with the flicker of a beacon on the launching platform. When the ship is ready for "take-off" the Hankin boys turn switches, and as the rocket motors whine to a deafening crescendo, a red glow shoots out from the finned end of the ship. The model is also fitted with a "ray gun" for defence purposes.



Mr. E. Henry, Spinkhill, Sheffield, who is an expert constructor of intricate models.

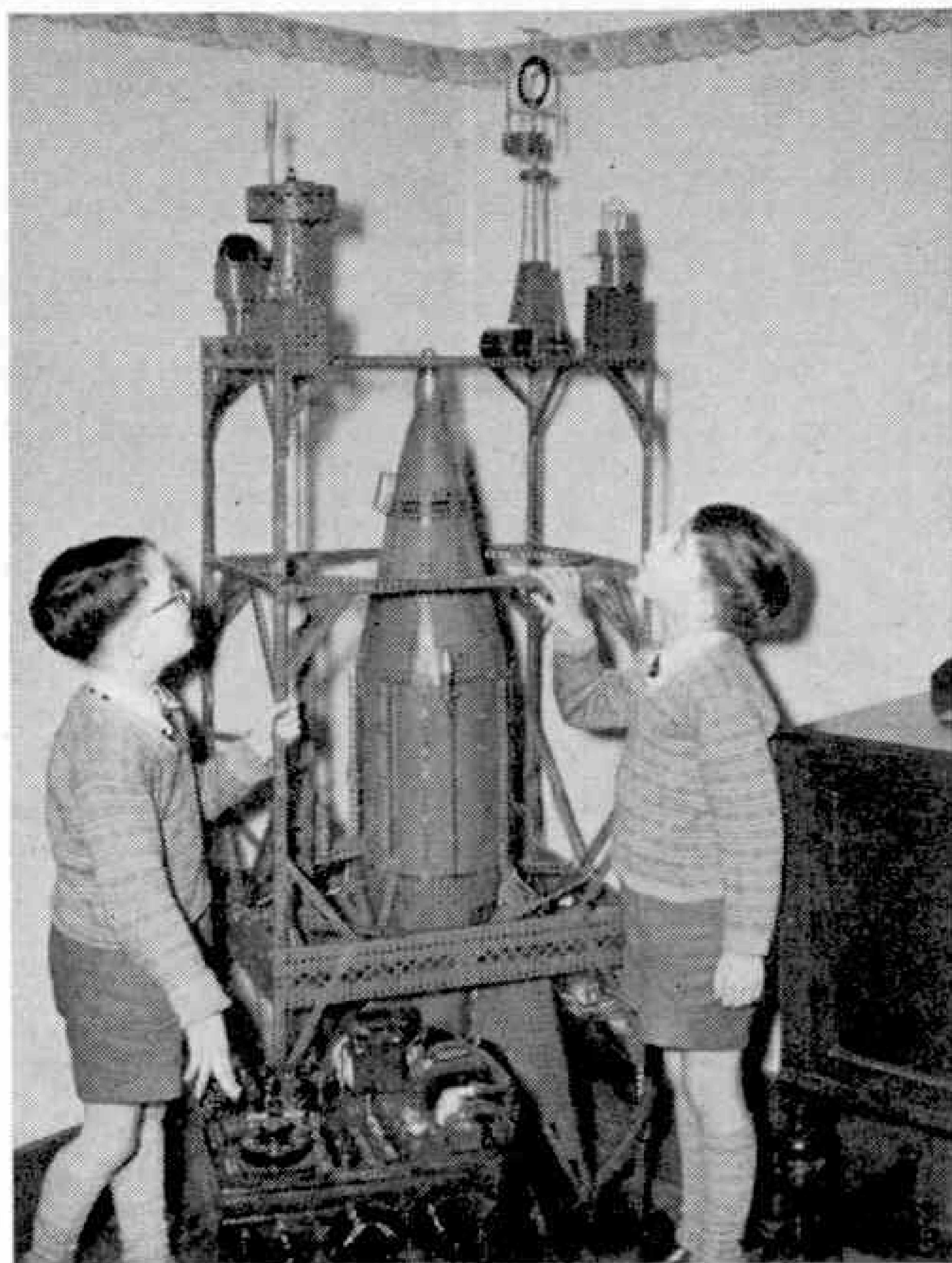
## AUTOMATIC CHANGE-SPEED MECHANISM

The mechanism illustrated in Figs. 1 and 2 on the opposite page was built by Mr. H. Taylor, Huddersfield, and is designed to provide a periodic change in the speed of a rotating shaft, with a neutral or non-driving period between each change. The ratios between the driving and driven shafts of the mechanism as illustrated are 3:1 and 2:1, but of course different ratios can be obtained by using other gears. If two 1" Gears are used for one set of gearing, and two  $\frac{1}{2}$ " Pinions with an idling  $\frac{1}{2}$ " Pinion between them are used for the other set, the mechanism can be arranged to provide an automatic reversal in the direction of rotation of the driven shaft. The gear change is effected quickly and smoothly, and an interesting feature is the novel arrangement provided to prevent the gears from sliding out of mesh during their driving periods.

The frame for the mechanism consists of two  $5\frac{1}{2}" \times 3\frac{1}{2}"$  Flat Plates joined by three  $3\frac{1}{2}" \times 2\frac{1}{2}"$  Flanged Plates, numbered 1 and 2 in Fig. 1. A  $3\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strip 3 is bolted across the frame and is spaced from the Flanged Plate 1 by three Washers.

The input shaft is a Rod 4 fitted with two  $\frac{1}{2}"$  diameter,  $\frac{1}{2}"$  face Pinions arranged with their teeth exactly in line. These Pinions are in constant mesh with a 57-tooth Gear on the sliding shaft 5, and with a 57-tooth Gear on a Rod that carries also a  $\frac{1}{2}"$  Pinion 6. The Pinion 6 drives a 57-tooth Gear on a Rod fitted with a Worm 7, and the latter engages a 57-tooth Gear on a Rod that carries a Bush Wheel 8. Two bolts are fixed in adjacent holes in this Bush Wheel by nuts.

The sliding shaft 5 is fitted with a  $\frac{1}{2}"$  Pinion and a  $\frac{3}{4}"$  Pinion that can be moved into mesh with a 57-tooth Gear or a 50-tooth Gear respectively on the output shaft 9. A Collar 10 is freely mounted between two Collars on the end of the shaft 5, and a 2" Strip is pivoted on a bolt that is fixed in Collar 10 by a nut. This Strip is lock-nutted to a Bush Wheel on a Rod 11 that carries a further Bush Wheel 12, the holes in which are filled by bolts held in place by nuts. A large Fork Piece is fixed on the end of Rod 11 and a Double Arm Crank is pressed against the Fork Piece by



Richard and Edward Hankin, playing with the model space ship built by their father at their Gravesend home.



the action of two Compression Springs. The Double Arm Crank is fixed on a Rod mounted in a  $1\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strip bolted to the side of the housing. Two Compression Springs are placed on the Rod between a Collar and the lower lug of the Double Angle Strip.

The mechanism is adjusted by arranging the Pinions on the sliding shaft so that they are equally placed between the Gears on the output shaft. When the driving shaft is turned the Bush Wheel 8 rotates slowly until the bolts in it engage the bolts in the Bush Wheel 12. The latter is then turned through a quarter of a revolution and one of the Pinions is moved into mesh with its Gear. A further quarter turn of the Bush Wheel 12 brings the mechanism into neutral again, and the next quarter revolution brings the second Pinion into mesh with its gear to provide a different ratio.

#### FREE WHEEL CLUTCH

Free wheel movements have been the subject of previous suggestions that have appeared from time to time in the *M.M.*, but the free wheel clutch described this month (Fig. 3) is arranged on rather different lines.

It comprises two Face Plates joined together by two  $1\frac{1}{2}"$  Bolts. The Face Plates are free to turn on a Rod 1, and between them a built-up pulley 2 is fixed on the Rod. This pulley consists of two Bush Wheels pressed one on either side of a 1" loose Pulley, which is fitted with a Rubber Ring.

A short length of Cord 3 is doubled and wrapped round the pulley. The free ends are then passed

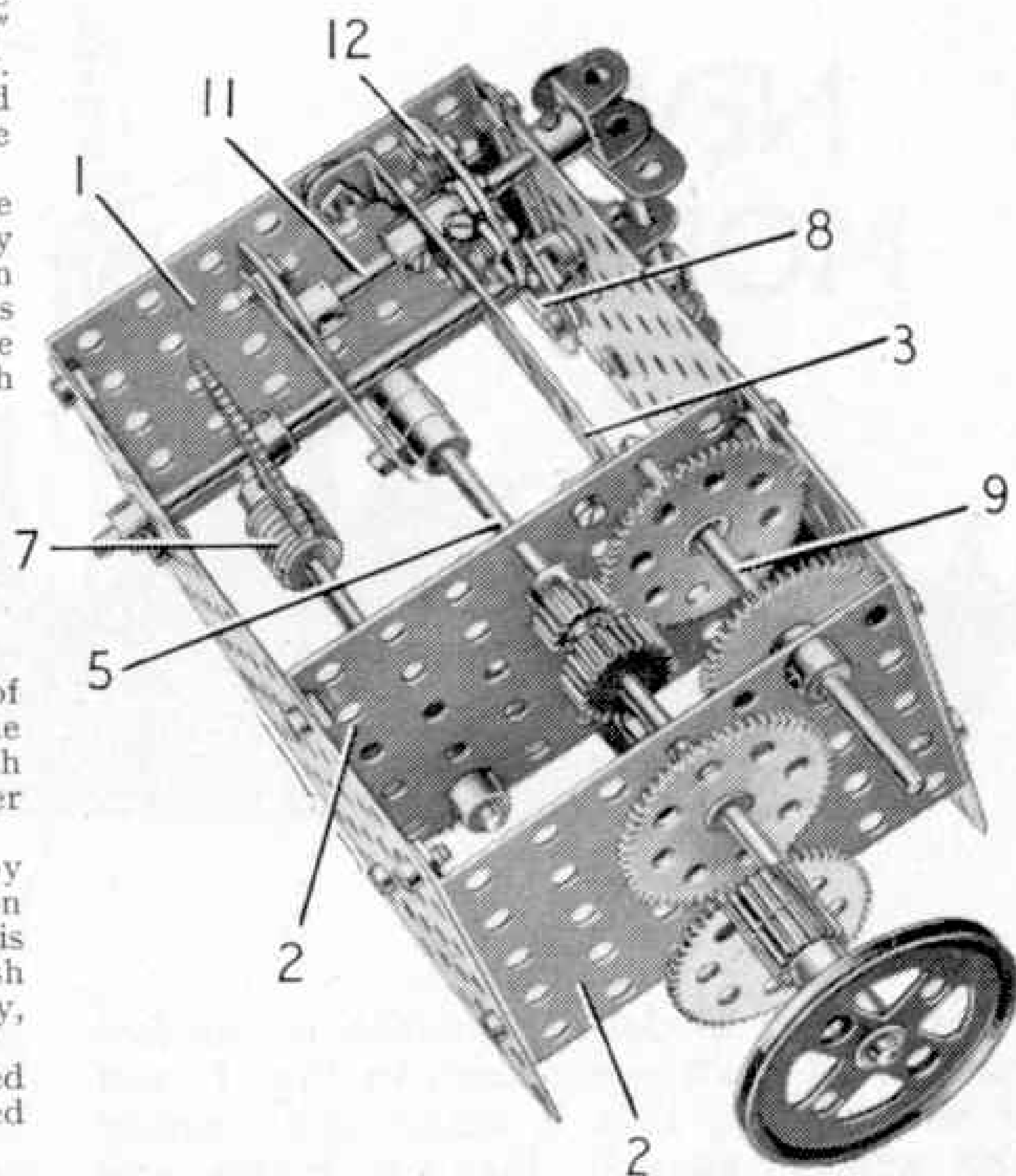


Fig. 1. An automatic speed-change mechanism built by Mr. H. Taylor, Huddersfield.

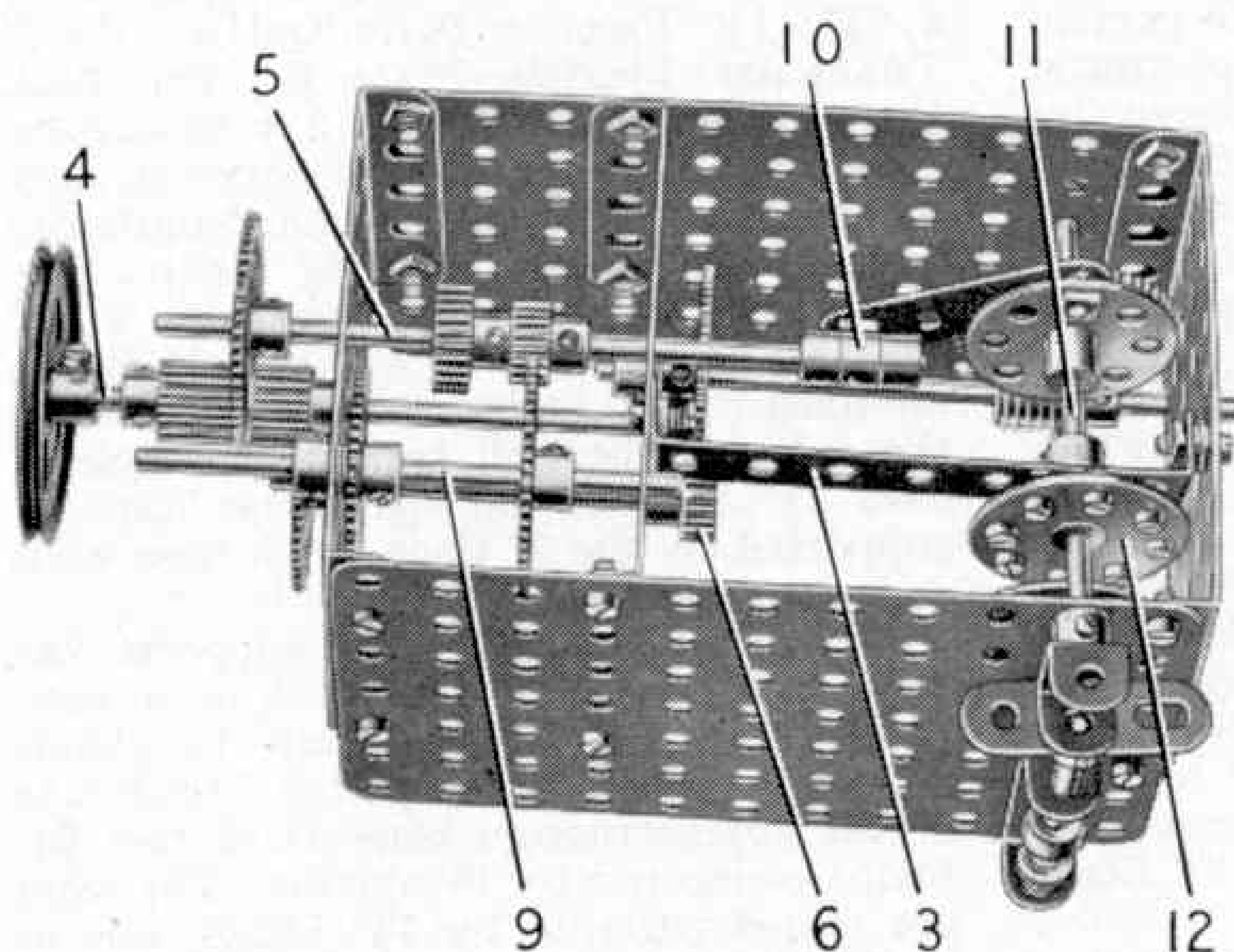


Fig. 2. Another view of the auto speed-change mechanism.

through the loop and secured to one of the  $1\frac{1}{2}"$  Bolts as shown in the illustration. It will be found that when the Rod 1 is prevented from rotating it is possible to turn the Face Plates easily in one direction, but in the reverse direction considerably greater effort is needed.

Meccano boys will be able to think of many applications for this mechanism. For example, it could be included in the drive of a model Big Wheel so that when the Motor is switched off the Wheel will come to rest gradually, instead of coming to an abrupt standstill that strains the gearing.

This arrangement is capable of transmitting a powerful drive and is suitable for large models. The momentum of fairly light models may be insufficient to bring the free wheel mechanism into action, and in these cases the pulley 2 can be replaced by a pulley made from a  $1\frac{1}{2}"$  Flanged Wheel and a Bush Wheel.

#### THE MECCANO MOTOR TYRES

Some of my correspondents seem to find difficulty in fitting the Meccano 3" Motor Tyres to the Pulleys, and I think a few words on this matter will be helpful to model-builders generally. Actually these Tyres are made slightly undersize in order to allow for the stretching that takes place after the Tyres have been fitted to and removed from the Pulleys for several times. If the Tyres were made to the exact size they would not grip the Pulleys tightly enough after they had been in use for some time.

Generally, however, a new Tyre can be fitted to the Pulleys without any undue difficulty simply by rolling it on to the rim by the pressure of the thumbs. Levers should not be used as these may cause damage to the rim of the Pulley.

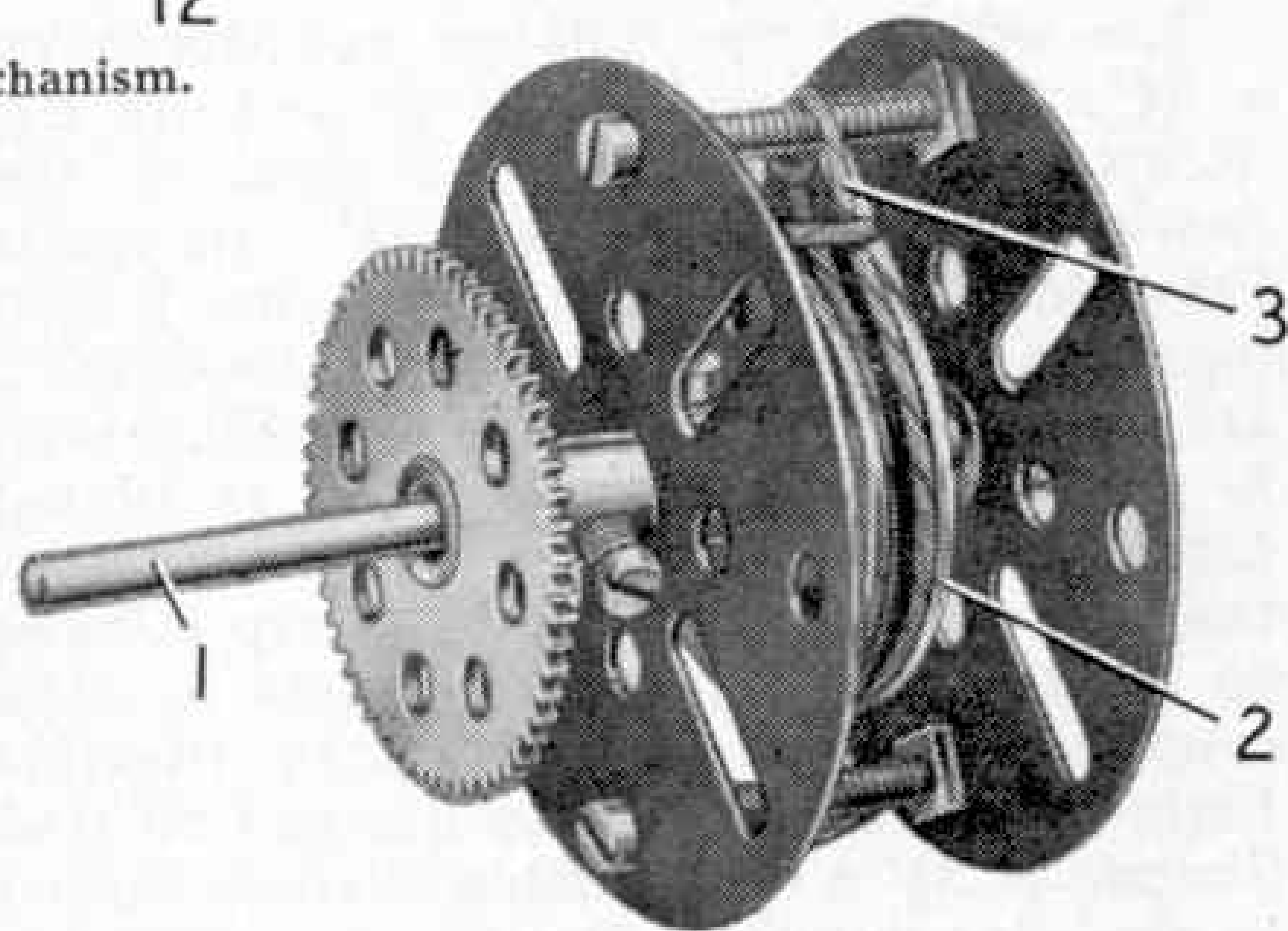


Fig. 3. An unusual type of free-wheel clutch.

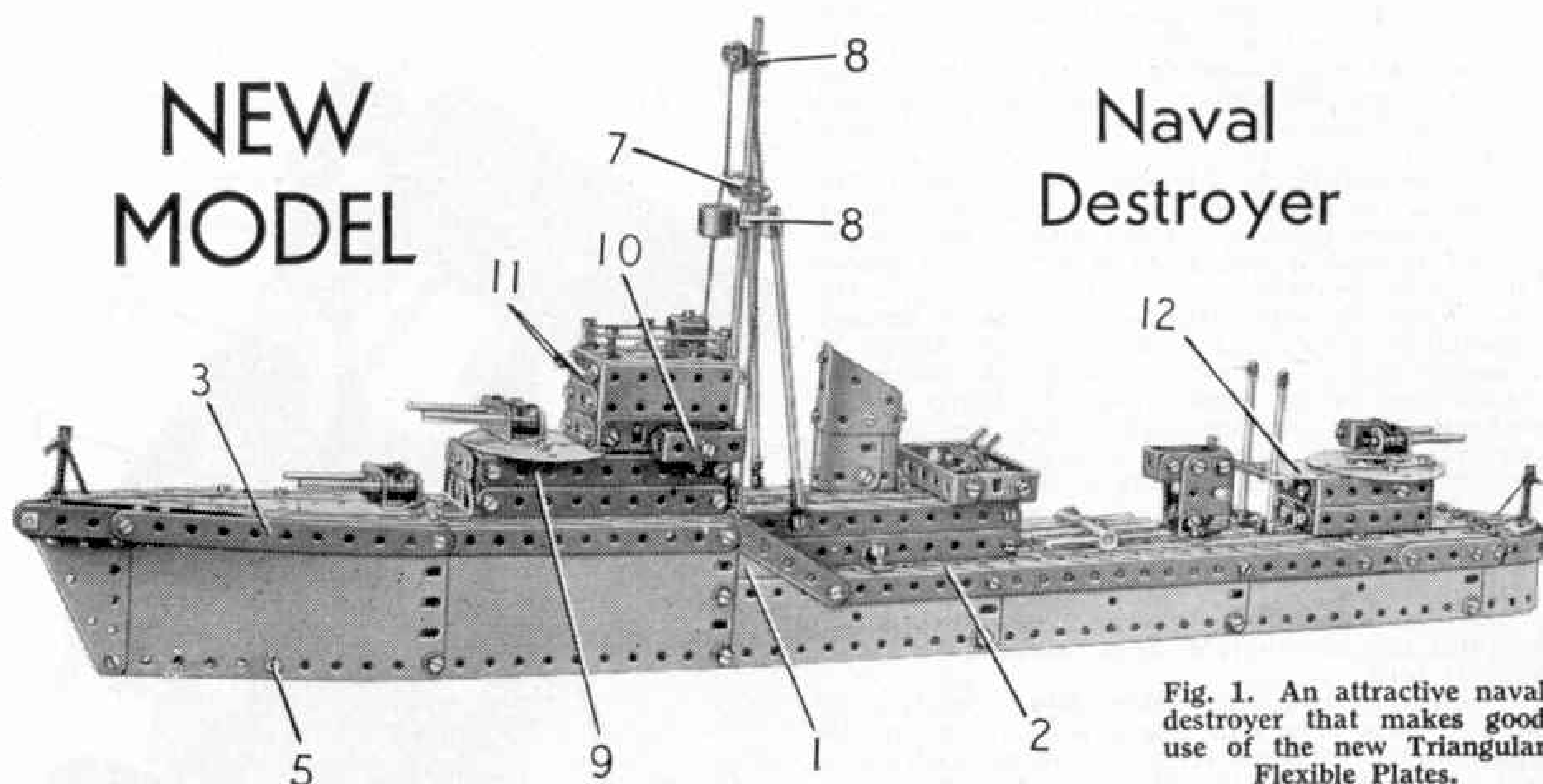


Fig. 1. An attractive naval destroyer that makes good use of the new Triangular Flexible Plates.

OUR new model this month is the fine naval destroyer shown in Fig. 1, and it will be seen that it makes good use of the new Triangular Flexible Plates and other new parts, which contribute greatly to its attractive and realistic appearance.

Construction of the ship is begun by bolting together the Plates that form the sides of the hull. Each side consists of a  $2\frac{1}{2}'' \times 1\frac{1}{2}''$  Triangular Flexible Plate at the bow, two  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plates and three  $5\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plates. A  $2\frac{1}{2}'' \times 1\frac{1}{2}''$  Triangular Flexible Plate 1 is fixed between the rear  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plate and the front  $5\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plate, and is edged as shown by a  $2\frac{1}{2}''$  Strip. The top edges of the  $5\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plates are strengthened by  $12\frac{1}{2}''$  Angle Girders 2 on the inside, with a  $12\frac{1}{2}''$  Strip extended by a  $2\frac{1}{2}''$  Strip bolted along the outside edges of the Plates.

A built-up strip 3 is fixed to each side as shown. This strip consists of a  $2''$  Strip and two  $5\frac{1}{2}''$  Strips.

The sides of the hull are connected by a  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate 4, and by  $2\frac{1}{2}''$  Strips bolted between the ends of the Angle Girders 2. The  $2\frac{1}{2}'' \times 1\frac{1}{2}''$  Triangular Flexible Plates at the bows are bolted together, and the front ends of the strips 3 are connected to them by a Fishplate. A  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip is bolted between the lower edges of the sides of the hull amidships and a  $1\frac{1}{2}''$  Strip is fixed to Angle Brackets held by bolts 5. The rounded stern is a curved  $5\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plate strengthened by two Formed Slotted Strips. A  $2\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plate is bolted to the rear flange of the Flanged Plate 4.

At the bow two  $3\frac{1}{2}''$  Strips on each side

are bolted together and are attached to the Flanged Plate 4. The front ends of the Strips are connected by a  $1\frac{1}{8}''$  Bolt, and the deck between them is filled in by a  $2\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plate and a  $2\frac{1}{2}'' \times 2''$  Triangular Flexible Plate 6. The deck between the Angle Girders 2 is formed by three  $12\frac{1}{2}''$  Strips, the outer Strip on each side and each Angle Girder being lengthened towards the stern by a  $3\frac{1}{2}''$  Strip. The centre  $12\frac{1}{2}''$  Strip is extended by a  $2\frac{1}{2}''$  Strip. The stern ends of the  $3\frac{1}{2}''$  Strips are fixed to a  $2''$  Strip, which is attached to the sides of the hull by Angle Brackets. Two  $2\frac{1}{2}''$  Stepped Curved Strips also are supported by the  $2''$  Strip, with their ends connected by a  $1\frac{1}{8}''$  Bolt.

The superstructure that supports the mast and funnel is assembled as a unit, and is attached to the hull by Angle Brackets when it is completed. Each side of the superstructure consists of two  $5\frac{1}{2}''$  Strips connected by Fishplates. The sides are joined together by  $1\frac{1}{2}''$  Strips, one at each end attached to Angle Brackets, and the top is filled in by three  $5\frac{1}{2}''$  Strips.

The mast is an  $8''$  Rod fixed in a Double Arm Crank, and it is fitted with a Coupling 7 and two Collars 8. Two  $1''$  Rods, each of which carries a Cord Anchoring Spring at its outer end, are fixed in the Coupling. A Chimney Adaptor is held by a nut on a bolt screwed into the lower one of the Collars 8, and two Right-Angle Rod and Strip Connectors are mounted on another bolt screwed into the same Collar. A  $5''$  Rod in each Right Angle Rod and Strip Connector is attached to the superstructure by a Rod and Strip Connector. Two Rod



and Strip Connectors are fixed by a nut on a bolt screwed into the Collar 8 at the top of the mast.

The funnel is formed by two  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plates and two  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Triangular Flexible Plates, and is attached to the superstructure by two Angle Brackets. The platform behind the funnel is a  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flanged Plate edged by two  $2\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strips. The A.A. guns on the platform are  $\frac{3}{4}"$  Bolts, each of which is fixed by a nut in an Obtuse Angle Bracket. The Obtuse Angle Brackets are bolted to a 1" Triangular Plate, which is lock-nutted to the platform and is spaced from it by Washers.

The superstructure below the bridge consists of a  $4\frac{1}{2}"$  Strip and a  $4\frac{1}{2}"$  Angle Girder 9 on each side connected by Fishplates, and attached to the Flanged Plate 4 by Angle Brackets. The Angle Girders 9 are connected by two Semi-Circular Plates that form the gun platform, and by a  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate to which two  $1\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strips 10 are attached by means of Angle Brackets.

The bridge is assembled by bolting  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flanged Plates to  $2\frac{1}{2}"$  Angle Girders fixed to the Angle Girders 9.

The Flanged Plates are connected at the front by two  $1\frac{1}{2}"$  Strips, and at the rear by a vertical  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate. The top of the bridge is another  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flanged Plate fixed in place by nuts on two 3" Screwed Rods 11. A

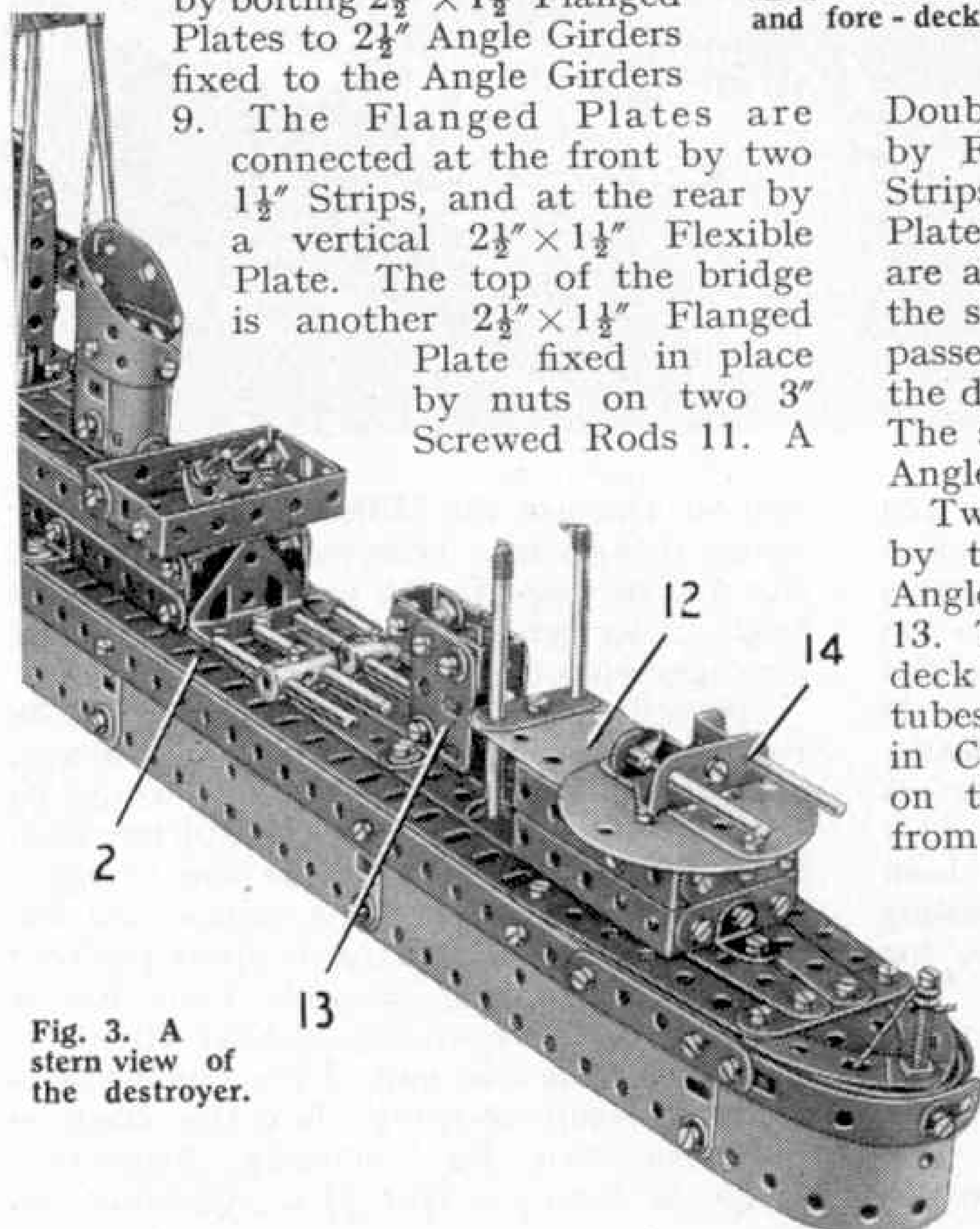


Fig. 3. A stern view of the destroyer.

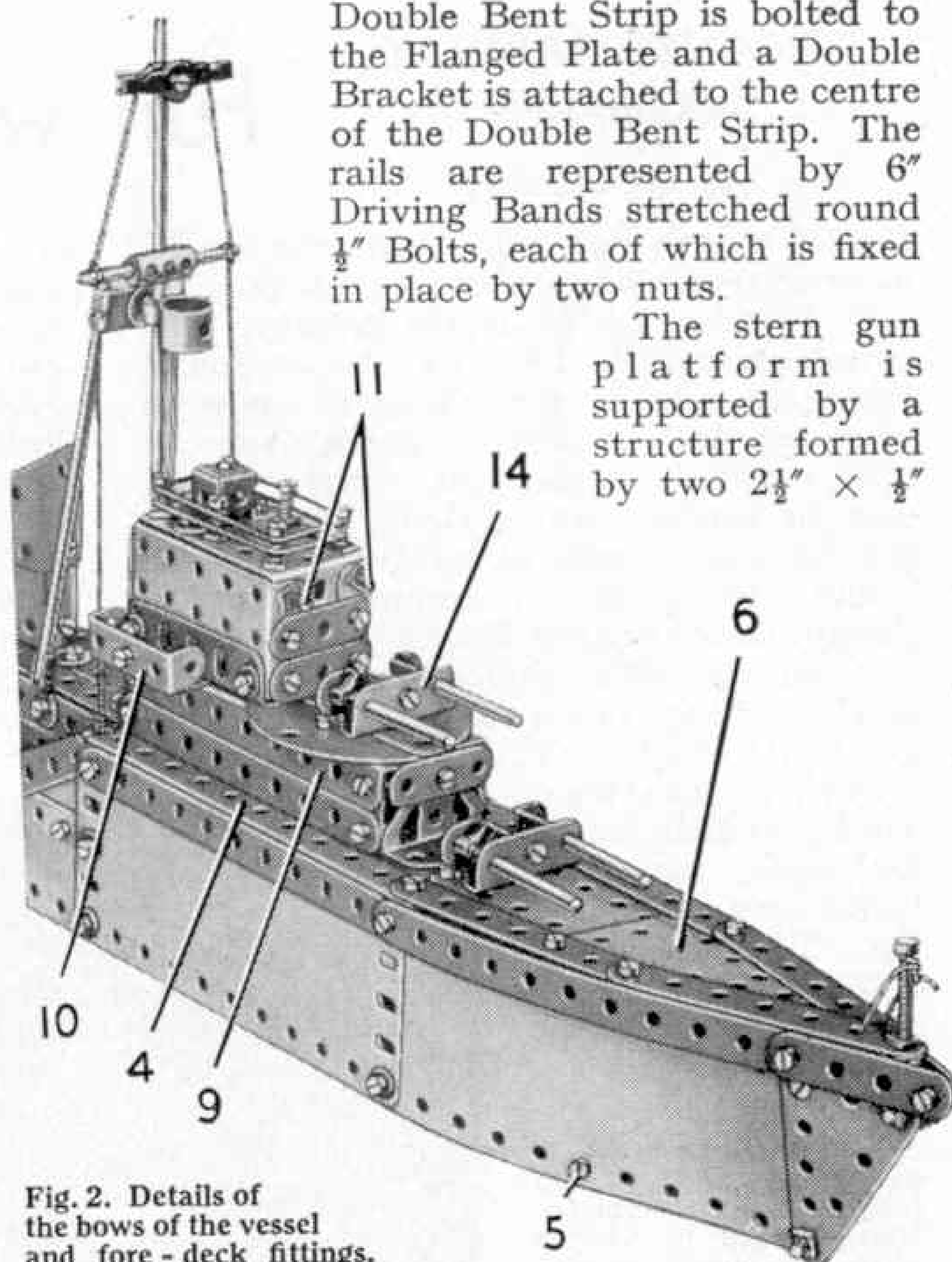


Fig. 2. Details of the bows of the vessel and fore-deck fittings.

Double Bent Strip is bolted to the Flanged Plate and a Double Bracket is attached to the centre of the Double Bent Strip. The rails are represented by 6" Driving Bands stretched round  $\frac{1}{2}"$  Bolts, each of which is fixed in place by two nuts.

The stern gun platform is supported by a structure formed by two  $2\frac{1}{2}" \times \frac{1}{2}"$

Double Angle Strips on each side connected by Fishplates and joined across by  $1\frac{1}{2}"$  Strips at each end. Two Semi-Circular Plates and a  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate 12 are attached to Angle Brackets bolted to the sides of the structure. Two  $3\frac{1}{2}"$  Rods passed through the Flexible Plate 12 and the deck are held in place by Spring Clips. The structure is attached to the deck by Angle Brackets.

Two  $1\frac{1}{2}"$  Angle Girders are connected by two Double Brackets, and to each Angle Girder is bolted a  $1\frac{1}{2}"$  Flat Girder 13. The Flat Girders are attached to the deck by Angle Brackets. The torpedo tubes are represented by  $2\frac{1}{2}"$  Rods fixed in Couplings, each of which is screwed on to a bolt passed through the deck from underneath.

Each gun turret is made by bolting a Double Bent Strip to a Trunnion 14 as shown in Fig. 2. The guns are 2" Rods and are held in place by Spring Clips. The turrets swivel on  $\frac{3}{8}"$  Bolts lock-nutted to the gun platforms.

(Continued on page 408)

## HORNBY RAILWAY COMPANY

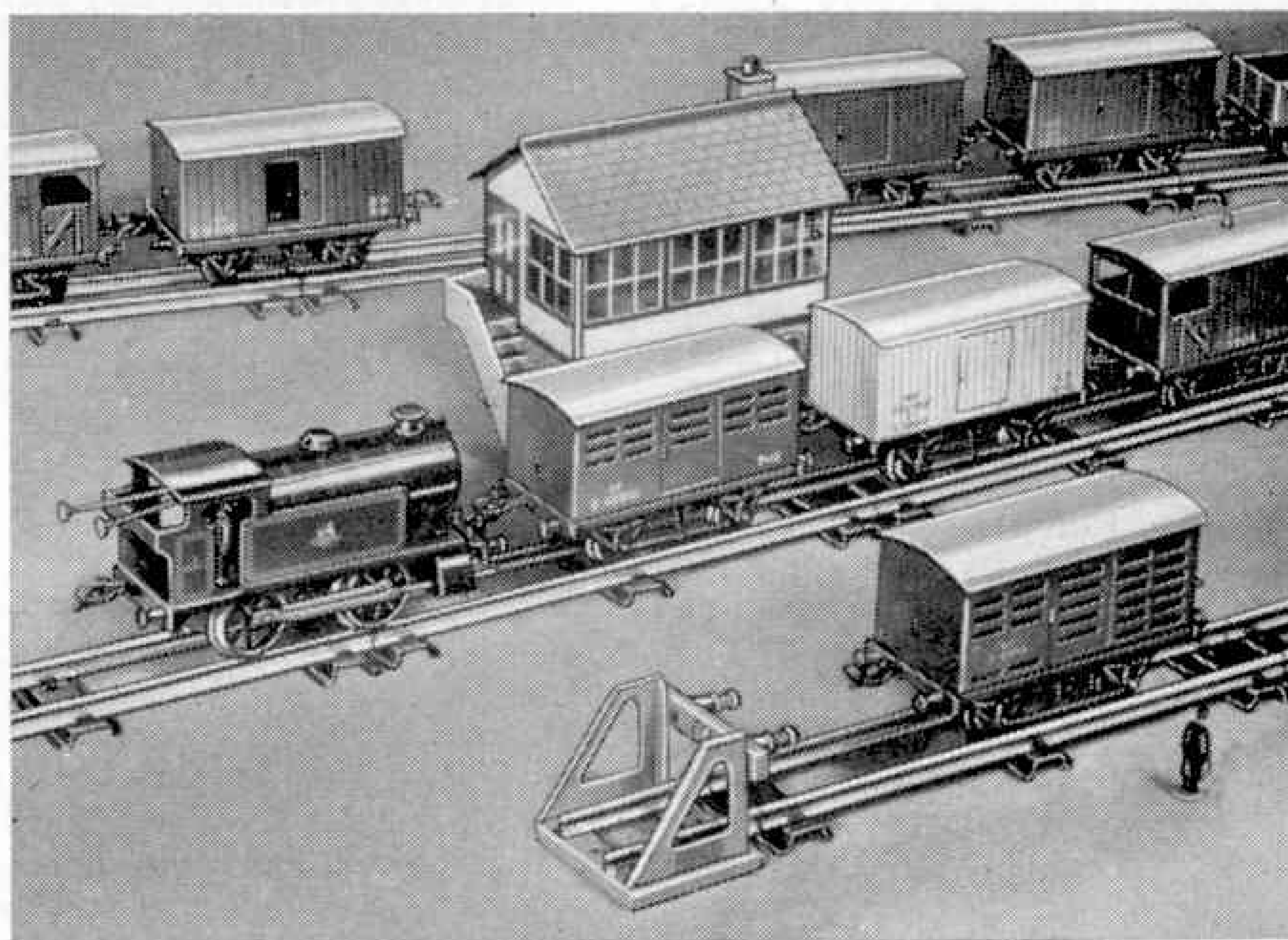
By the Secretary

# Fun with the Goods

LAST month you read about the varied operations and greater fun now possible with Hornby Trains as the result of the introduction of B.R. liveries. As you found then, passenger train workings can now be extended and improved, particularly at this busy time of the year. Now it is the turn of goods train working, which also can be made more attractive than ever before, following on improvements in Hornby Goods Rolling Stock and operations.

A fair amount of choice in the matter of goods rolling stock has always been possible for the Hornby Railway owner, so that trains for most types of traffic can be made up. The revised colourings and markings of the

A short goods train is leaving the yard to pick up further freight vehicles. Hornby Vans of various kinds are shown in this picture.



various vehicles now in B.R. finish have a special interest. Broadly speaking, grey is the colour for ordinary goods vehicles that are not in real practice fitted with automatic brakes. Thus in the Hornby System the familiar Open Wagon and the Hopper Wagon are finished in this way, with white lettering appearing on the characteristic black patch familiar on the real vehicles. Vans, including the Goods Van, Cattle Truck and the Goods Brake, now appear in the bauxite red that is reserved for brake-fitted vehicles. This distinction means that we can run these types in express or "fitted" goods trains when the running programme calls for such movements.

There are two exceptions to the general rule for vans. These are the Refrigerator Van and the Milk Van. The Hornby representative of the former is now correctly produced in the standard white

finish applied to B.R. refrigerated vehicles and containers used for perishable commodities. In this finish, with grey roof and with the characteristic code name *Vent Insul-Meat* on its sides, the Hornby Refrigerator Van is indeed a trim and efficient looking vehicle. The Hornby Milk Traffic Van formerly represented a Southern Railway vehicle, and so was finished in the striking shade of green used by that company for its coaching stock. Now it is changed to the present smart B.R. red. This is the red used for B.R. coaching stock

and we can use the Milk Van in passenger trains if we wish. Otherwise, of course, it can run in special milk or ordinary freight trains, as required by the working arrangements on our line.

Actually any of the Hornby Vans can be run in a passenger train when necessary, except the Goods Brake Van. It would be quite in order to run a Milk, Refrigerator, Cattle or Goods Van "inside the engine", that is to say between the engine and the train, or it could be coupled up at the rear end. Each of the Hornby Vans has a lamp bracket at each end, so that when it is running at the rear end of passenger trains the tail lamp showing that the train is complete can be correctly displayed. There is then no fear of a conscientious



model signalman stopping the train for examination because the rear lamp is not showing!

Private owners' vehicles of more or less

whichever way the Van happens to be travelling. There is a tail lamp bracket at each end, and in addition there are brackets for side lamps as well, and the lamps for placing on them are provided with the Van. The side lamp brackets are duplicated, so that the side lamps can

A Hornby Milk Van attached next to the engine on a stopping passenger train. Over the wall from the railway is a realistic street scene showing various Dinky Toys.

be attached at the same end of the vehicle as the tail lamp. Side lamps should be placed on their brackets to

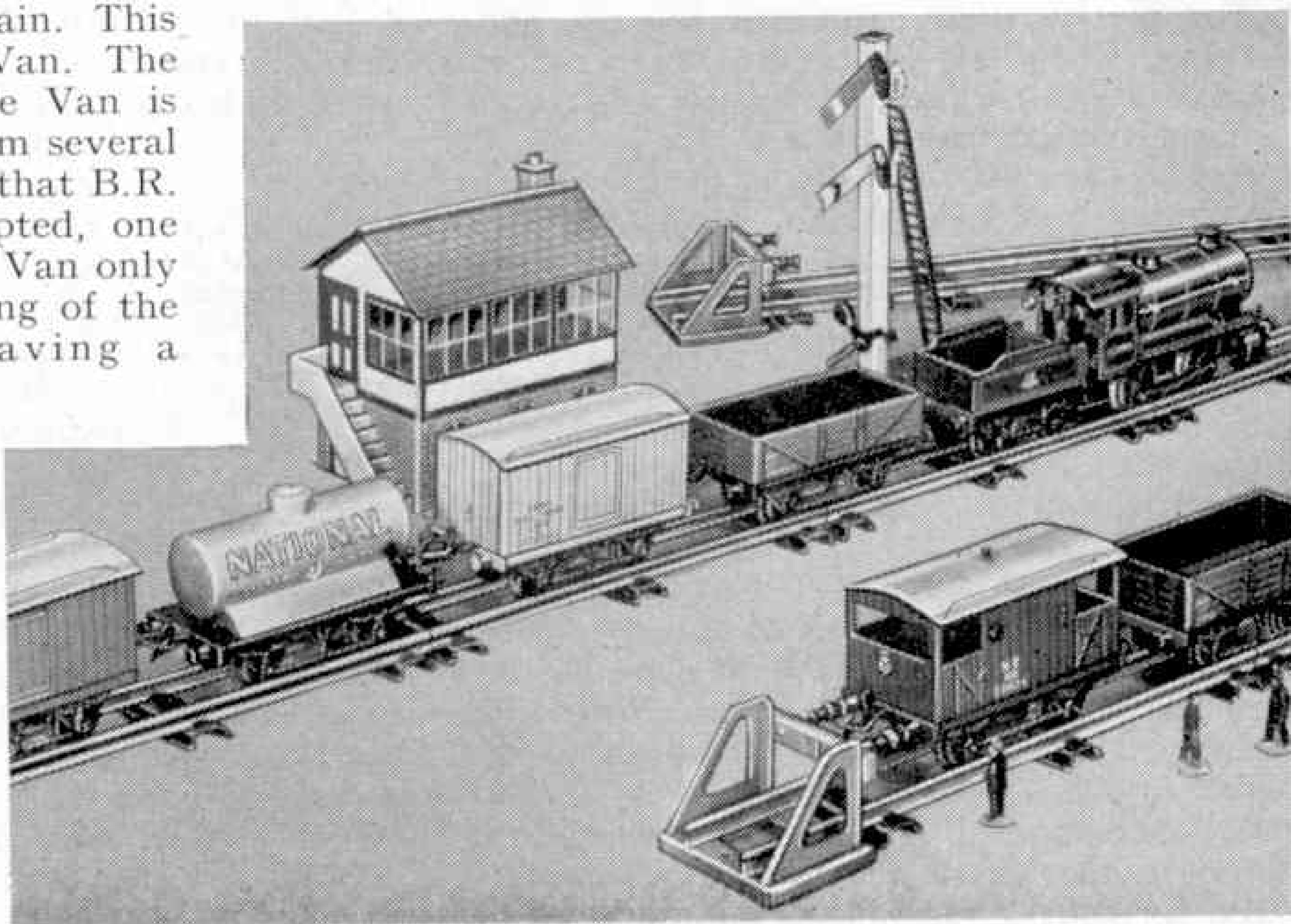
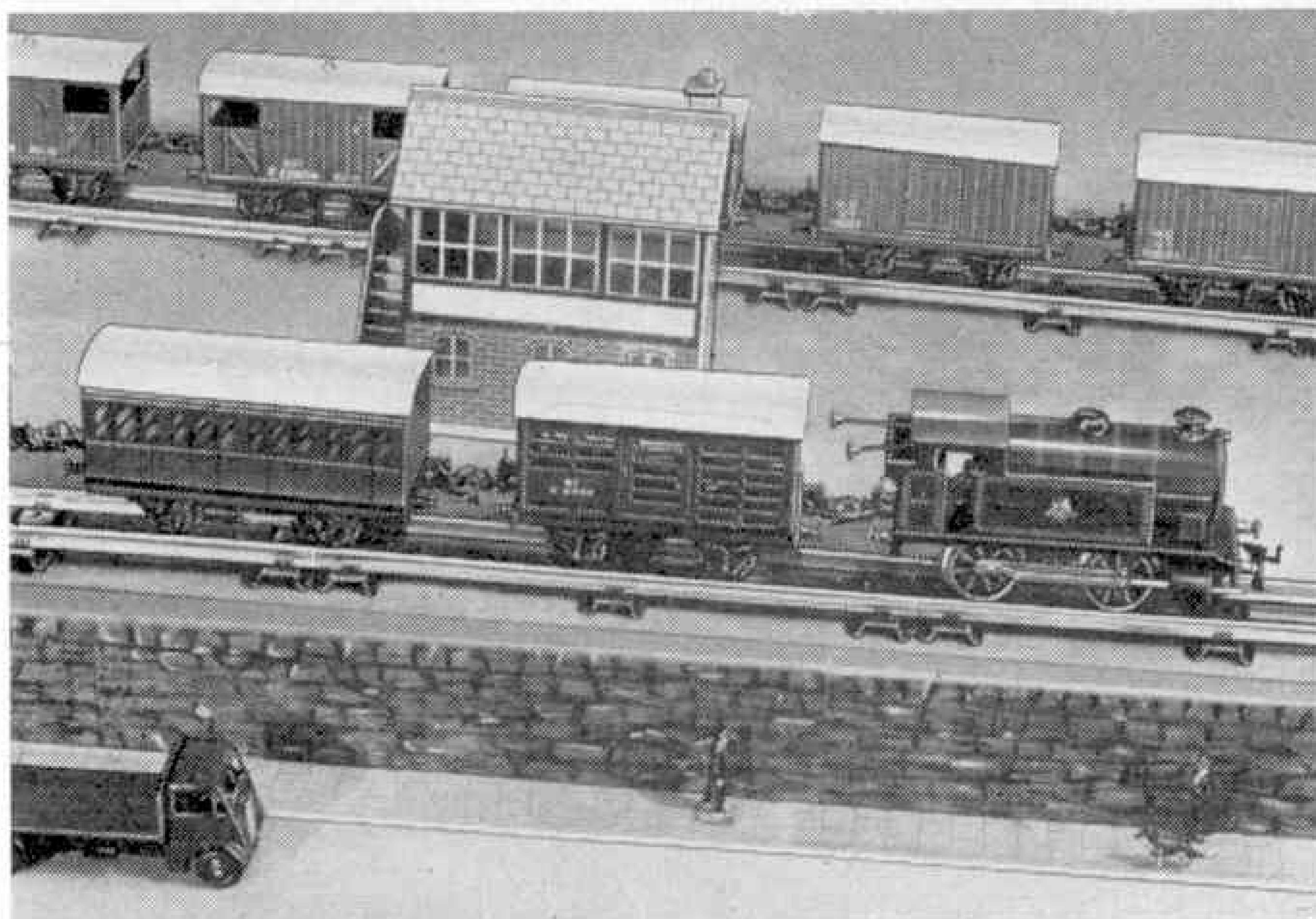
show a white indication ahead and a red one to the rear.

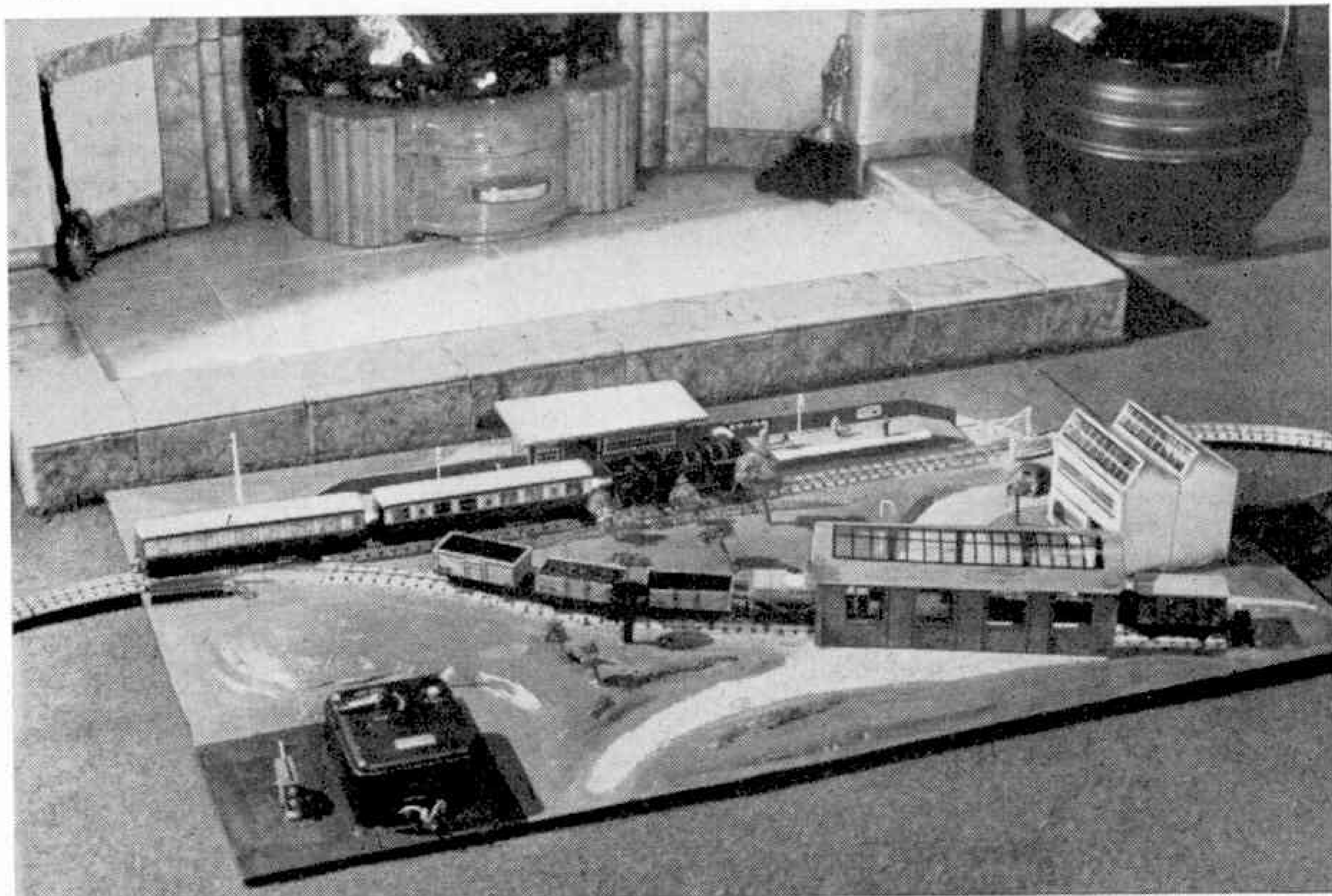
special character, such as the Cement and Tipping Wagons, are not affected by the change, and this applies also to the Tank Wagons and to the Lumber and Timber Wagons, which have not normally been lettered in the Hornby System. Similarly, service vehicles such as the Gas Cylinder Wagon and the Crane Truck remain as before.

To end these notes, let us consider, appropriately, the last vehicle on a goods train. This is the Goods Brake Van. The Hornby Goods Brake Van is of special interest from several points of view. Now that B.R. livery has been adopted, one type of Goods Brake Van only is produced, this being of the useful pattern having a verandah at each end. The goods guard therefore can keep his train under observation

Here is an important point that I must make clear. The introduction of B.R. goods stock, does not mean that stock already in use cannot be run. On real railways it takes quite a time to make a complete change, and there is nothing against mixing types of wagons, which anyway on real railways seem to be more varied than ever before.

A mixed goods train gets the road past the Hornby Signal Cabin. The Brake Van in the siding has side and tail lamps in position on their brackets.





## The Railway on the Carpet

By E. Fearnley

NO memory of boyhood days is complete without a mental picture of the grand Gauge 0 layout we had in the two large attics of our old home. The hours of pleasure it gave in those happy pre-war days are very difficult to describe adequately.

For my own son, now growing up, the housing situation offers no hopes of a similar layout for the near future. Still, one of his first real toys was a Hornby-Dublo Goods Train Set, but to set this out on the dining room table or floor, if it pleased Junior, certainly did not satisfy Father. He expected something a little more realistic than a background of furniture and carpet to set off the railway.

What was to be done? Anything of a permanent nature was out of the question. Yet, feeling that something was needed to give modelling scope and to allow the Points and wiring up to be fixed, so as to avoid a lot of fiddling whenever "train time" came round, I hit on the idea shown in the accompanying pictures. Why not build a "centre" for the track on a large

plywood board, which could be lifted up and stored in a cupboard when not in use?

This was my answer, and it has proved a great success. I can indulge in all the details I like on the track, wire up Electrically-Operated Points, Signals and so on; in addition, I am not tied to any definite track in the complete layout. As more track is added, so the scope of the

railway improves. Its size can be increased as far as the room will allow. In addition, it is possible to add more "centres", each coupled to the next.

It was decided that a small wayside station with a goods siding and an unloading shed would be the ideal start for the system. We already had a goods set and the addition of some D11 Coaches gives the impression of a local line, so the single track is quite in keeping. If in future more equipment is added, the present "centre" can be relegated to a branch line and if, as is hoped, room for a permanent way is available, the present work is not wasted because it can easily be built into the layout.

Above is a general view of the station and goods siding in front of the fireplace, with tracks extended from it as described in this article. The Transformer is enclosed in a model factory.



The rails on the board are of course higher than those on the general layout, and unless the slope is evened out over the first two rail lengths, there can be a danger of coaches uncoupling over the changes of grade. The addition of small plywood blocks under these rails gets over the snag very easily. It is intended in the future to carry construction a stage further by fixing all the rails on plywood strips a little wider than the base of the rails. This will allow the ply to be shaped to accommodate a miniature lineside bank, if necessary; or such small details as huts or fences can be added.

As to the actual construction, there is nothing the average fretworker cannot do. Start with the baseboards. Ours is of 5 mm. plywood, 3 ft. long by 2 ft. wide. The rails and points were first laid out on this base, and after a satisfactory arrangement had been made, the outline of the track was pencilled in. Then the buildings were decided upon; a through station to occupy one side of the through line, a goods station, and then a small factory was chosen to hide the Transformer in a suitable place.

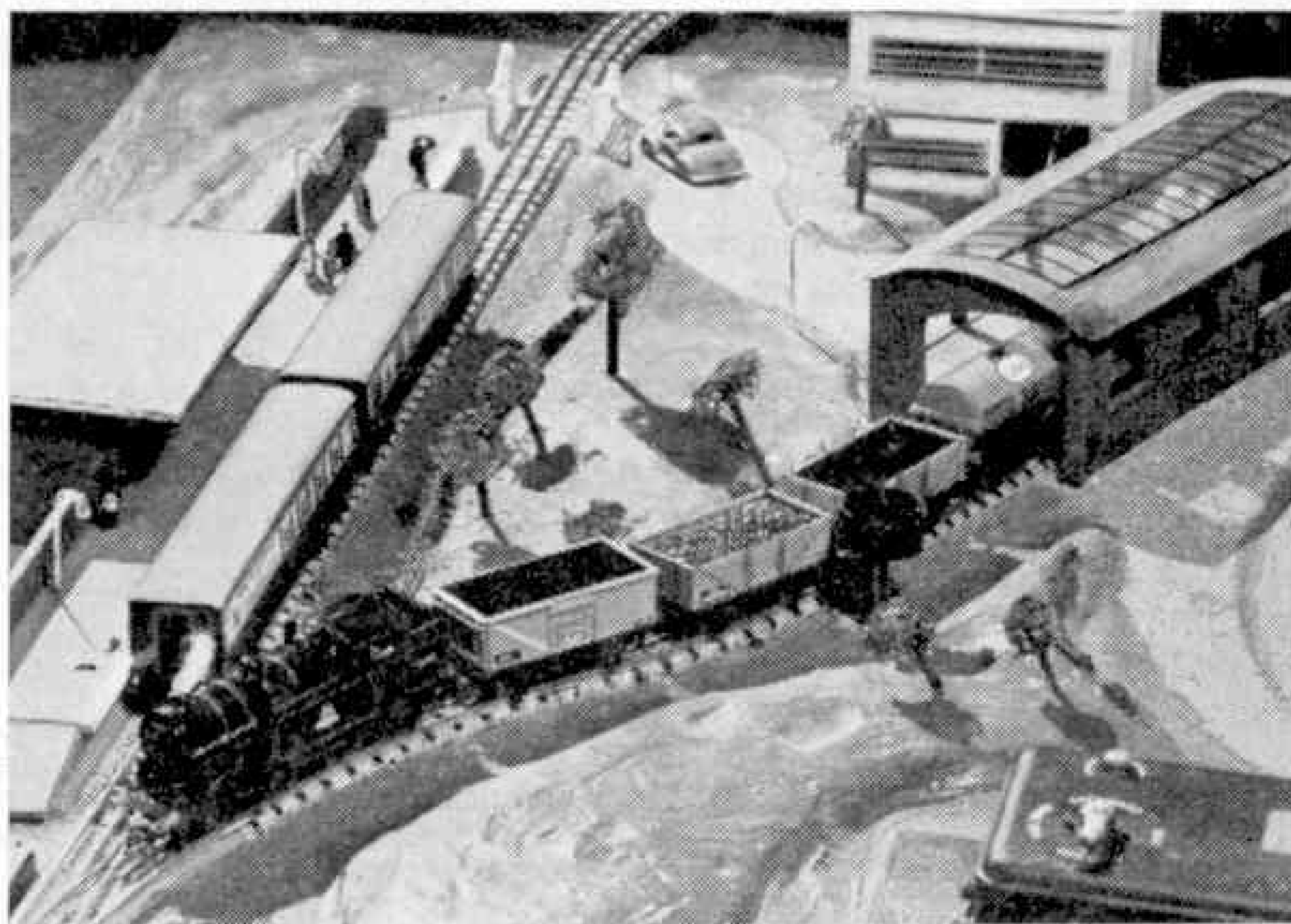
The hills were made from a plaster compound obtainable from any paint shop, used for decorating walls with that imitation rough plaster effect. It is quite cheap. A substitute could be plaster of Paris, or a mixture of cement and glue size. To save weight, and plaster, if a high hill is desired, it is suggested that a light structure of cardboard or wood should be built under the "ground" first.

This stuff will set in about 24 hours in a warm room, and then work can proceed. Green paint will transform the plaster to give a more realistic appearance. Where roads have been planned, we coat the surface of the board with rather thin glue size and while it is wet liberally sprinkle on it a packet of the type of grit sold cheaply for bird cages. The excess will brush off when dry. While this is being done a Level Crossing can be added if it is wanted. Ours is home-made, consisting of plastic wood moulded to the rails and coated with the glue and grit, with gates made of  $\frac{3}{16}$  in. dowel drilled into the base, and glued in place. The

cross bars are of piano wire. Fix with balsa cement, and paint white. The car is a small plastic one now painted the same colour as Father's. Trees were added to give the rural touch. These were made from dowel, with green-dyed loofah sponge cemented in place. The dowels go well into the base, and are quite strong enough to stand rough use.

After the station and goods depot were painted, a set of Hornby-Dublo platform figures were added. The platform was drilled to the size of their circular bases and the tiny people cemented, again with balsa cement, with their bases flush with the platform. Station lamps were made of wire bent to shape with about  $\frac{3}{8}$  in. of transparent tubing cemented on the end to form the globe in modern shape.

There is of course no limit to the detail that it is possible to add at this stage. A dockside scene could be set up with wharves and sheds. If sidings run along the quays, paving will be necessary in order to allow road vehicles to operate. This can easily be made from cardboard which will come right up to the railheads, the edges resting



A station view showing a train coming from the goods shed, with passenger coaches standing at the station platform.

on the track bases. For paving between the running rails, use Plasticine, leaving a clear flangeway for the wheels.

If you haven't room for a permanent way, try our portable one! It has given us the scope to do at least some of the things we wanted. We have had hours of pleasure building up the layout, with the advantage that we can add to it at any time, or use as it is, just as the mood takes us. Try it!

## Seen From the Air!

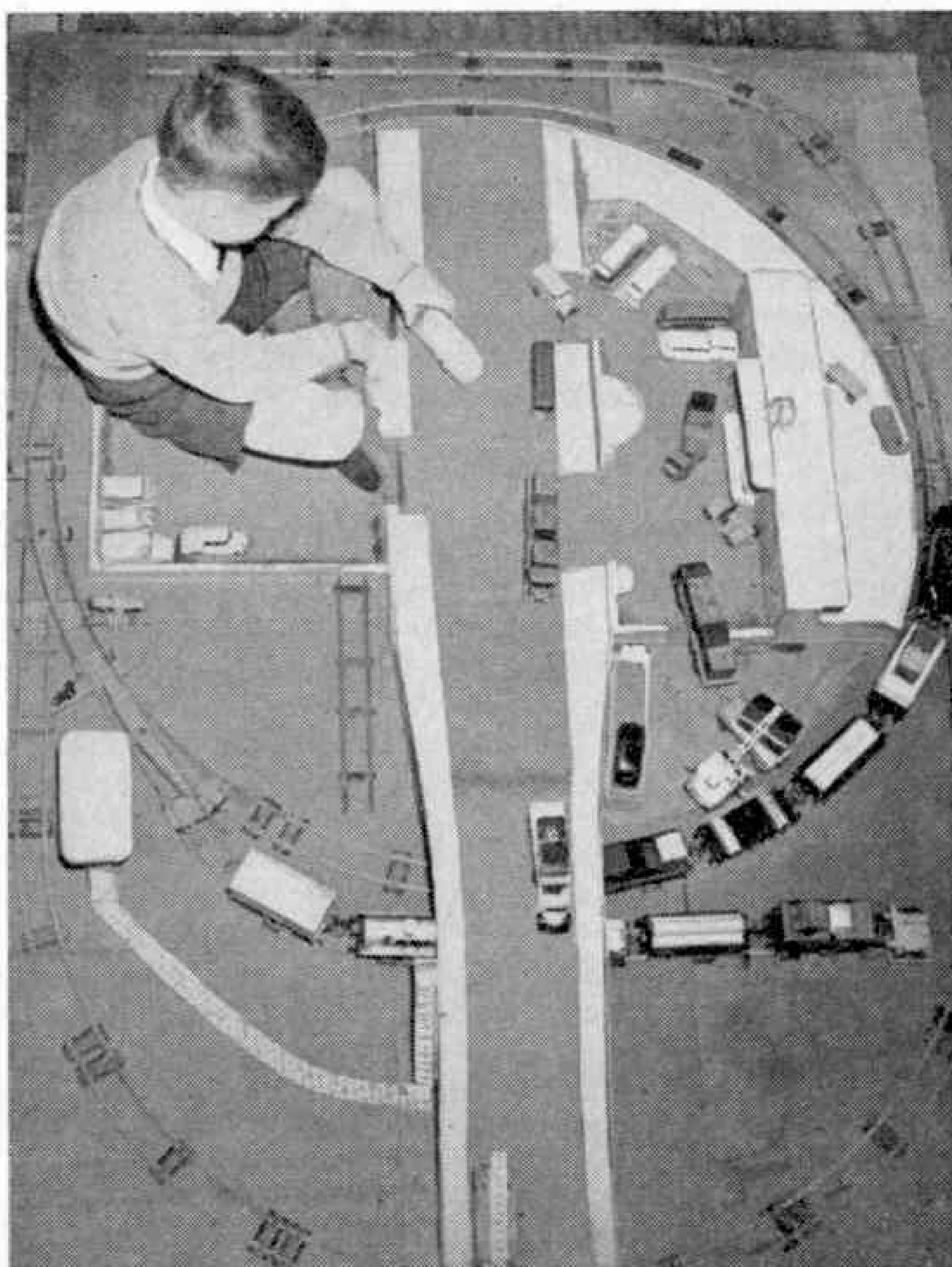
HERE we have a miniature railway picture that is unusual because it shows literally an aerial view of the system and its owner. Thus it differs from most layout photographs, which as a rule show a view taken along or across the track.

A special point about the illustration on this page, showing David Williams, of Liverpool, busy with his Hornby railway and Dinky road traffic layout, is that it shows practically the whole of the system in such a manner that any other enthusiast wishing to put together a similar layout can easily do so. David's railway is situated on the floor, but unlike many such systems it is arranged on a neat and workmanlike baseboard, 6 ft. 6 in. long by 4 ft. 6 in. wide. The board itself is suitably stiffened underneath and so has plenty of support, which is very necessary because, as you can see, David thinks nothing of sitting down in the middle of the system so that he can control operations right on the spot.

The railway plan is a useful development of the familiar oval and circle combined, and both the oval and the circle give off short branch tracks or sidings, one inside the main oval and one outside. These make it possible to vary the running arrangements and both these dead-end tracks are useful for storing rolling stock.

The railway serves a station, appropriately named *Williamsville*, which is situated inside the main running track. An unusual feature of its construction is that it has a curved platform. Platforms outside a curved track are not a big success in miniature, because of the comparative sharpness of the curves. But with platforms on the inside of a curve no particular difficulties need be anticipated, especially when the engines and rolling stock in use are of the comparatively short four-wheeled

David Williams, Liverpool, believes in getting right into the centre of things when he plays with his Hornby railway and road layout. This system is a simple one, but it is well equipped to provide lots of fun for him.



type, as they are on David's railway.

The business-like baseboard, the road bridge crossing the track and the station are the handiwork of David's father, Mr. H. S. Williams, who takes a keen interest in the railway and its running. Plywood

for walls and paving, screwed to a built-up framework specially arranged to suit the particular purpose in hand, has resulted in a neat and strong job.

The road, station approach and yard are covered with dark brown wrapping paper to provide a realistic surface. The station platform and the pavements that line the roadway are covered with a stiff manilla paper on which paving stones are drawn.

At the station road approach confusion is avoided by working a one-way traffic scheme, with the representative collection of Dinky vehicles that is in use. Road goods vehicles can reach part of the inner circular track and a mobile crane is there ready for lifting or transhipment work.





# Club and Branch News



## WITH THE SECRETARY

### ROAD SAFETY

In the latest of the always-interesting reports sent to me by the very capable Secretary of the Kentish Town Branch I was delighted to read that when it was decided to have cycling runs during the Summer sessions the senior members undertook to teach the juniors Road Safety. By way of encouraging these youngsters to take part in the cycling runs, the seniors also set about putting the youngsters' cycles into working order where necessary.

This is indeed giving practical expression to the Meccano Guild spirit of service, and shows fine comradeship among the members of the Kentish Town Branch.

I heartily recommend the above plan to other Clubs and Branches, and suggest that the Road Safety instruction be carried further by arranging local cycling runs with the juniors in groups of three or four, each in the charge of a senior member.

## CLUB NOTES

**SMITHFIELD (ABERDEEN) M.C.**—Meetings are being held on Tuesday and Friday evenings during the Summer. A fine model of a Dutch Windmill built by the members was displayed in a local shop window for one week and attracted much attention. Club roll: 30. *Leader:* Mr. G. Hart, 16 Lintmill Terrace, Aberdeen.

**CONSETT Y.M.C.A. M.C.**—Plans are in hand for several members to visit a local colliery and obtain data for building a model colliery. The construction of a permanent layout for Hornby train operations is in progress. The block system of signalling will be adopted, and the wires of the model telegraph poles will carry the current for the colour light signals. Club roll: 20. *Secretary:* J. N. Barron, 4 Garden Place, Leadgate, Consett, Co. Durham.

**MILE END (PORTSMOUTH) M.C.**—The new Dinky Toys International Road Signs and a model factory have been added to the Club's model town and a talk has been given on *Road Safety*. A fine Meccano fire engine built by a member, K. Mills, won a prize in a recent Club model-building competition. The contract time for completion of the large model submarine has been extended. A table tennis tournament and mock trials have provided good fun. Club roll: 52. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.



These cheerful and enthusiastic officials of the recently-incorporated Newport (I.O.W.) Church of England Boys' School Branch No. 550 are (above) David Cockshaw, Chairman, and (right) Graham Donne, Secretary. An excellent programme of track meetings is being carried out.



## BRANCH NEWS

**CHINGFORD**—Members have been busy extending the Branch layout, which now has a goods depot and a turntable. Other work carried out includes the construction of two stations for the portable layout used for Branch exhibitions. The last meeting of each month is devoted to train running. *Secretary:* G. Paton, 2 Bernwell Road, Chingford, London E.4.

**MILE END (PORTSMOUTH)**—Fishing is one of several new activities organised for the Summer months, and is very popular. During one contest held from boats off Southsea beach, the first prize went to a new member who caught seven bass weighing a total of 6 lb. 13 oz. The Secretary won a special prize for catching the most crabs. *Secretary:* J. C. Jeffery, 52a Elm Grove, Southsea, Portsmouth, Hants.

**KENTISH TOWN (LONDON)**—The Summer programme includes cricket, cycling and swimming. The senior members have trained the juniors in Road Safety, and where necessary have put their cycles in working condition. Although most of the boys are not expert cricketers, matches

have been good fun. This Branch now corresponds with the Hastings, New Zealand, Branch, exchanging photographs and news. *Secretary:* J. A. Kirby, 9 Busby Place, Kentish Town, London N.W.5.

**HINDHEAD AND DISTRICT**—Several members took part in a tour of Southampton docks organised by the Railway Enthusiasts Club of Farnborough. A total of 18 good photographs were taken during the outing, and these have been added to the official record of Branch activities. *Secretary:* B. J. Hinde, "Hindhead Brae," Hindhead, Surrey.

**NEWPORT (I.O.W.) CHURCH OF ENGLAND BOYS' SCHOOL**—A very interesting talk has been given by Mr. Seaman, a railway guard, who among other things described the work of a signaller in dealing with trains scheduled to pass his box, and explained the different types of signals and the system of route indicating discs and lamps used in the Southern Region. Many questions were asked at the end of his talk. *Secretary:* G. L. Donne, 45 Melbourne Street, Newport, Isle of Wight.

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# Stamp Collectors' Corner

By F. E. Metcalfe

## THE GLORY THAT WAS GREECE

IT is about a set issued by Greece at the beginning of the year, with designs depicting Ancient Greek Art, that I wish to write this time. As a lot of correspondence passes between Great Britain and Greece, and the stamps under review are of an ordinary definitive character, copies of these are to be picked up for very little. As a matter of fact those illustrated were taken out of a batch that came on letters to a London office. Collectors indeed will find no difficulty in getting together a used set, though one in mint state will cost about 13/-.

There are twelve stamps in the set, and the face value is from 100 to 20,000 drachma. The stamps have been printed by the lithograph process, and all are of intense interest to those who realise what glory was indeed that of Greece at the period illustrated. By the way, many who have dreams of countries they would like to visit, are sometimes disappointed when they get the chance to do so. None will ever be disappointed if they visit Athens.

Now let us look at the stamps. First the 100 drachma. Here we see the head of Pericles, Greece's greatest statesman. Born in the town of Cholargus, he lived from about 495 B.C. to 429 B.C. and some of the mighty ruins still extant in Greece today owe their inception to him.

The 200 drachma shows what appears to be a bull's head, but actually it is a Cretan libation vessel, made as long ago as about 1350 B.C. Found at Cnossus, the site of the once magnificent palace of Minos, it is a wonderful piece of work, made from soap-stone, inlaid with rock crystal, for the eyes, and with jasper. The wine was poured in the top, and it came out lower



down through a smaller hole.

All will be stirred by the portrait on the 300 drachma, for it is that of mighty Homer, the author of the Iliad and the Odyssey. Homer was said to have been a wandering minstrel, and to have been blind. He moved from city to city playing his harp and singing his songs. He lived about 850 B.C., and it was not until long afterwards that his poems were collected, and who can doubt that there were additions that perhaps were not the work of the great master. But these poems have moved the world for a long time, and will go on moving it so long as men remain civilised.

An equally great Grecian name figures on the 500 drachma, that of Zeus or, as the Romans called

him, Jupiter. As shown on the stamp, the god Zeus appears peaceful enough, but as time went on the Greeks considered him as the God of War. He was depicted as riding in a war chariot, letting loose thunderbolts on Greece's enemies. His name

Zeus means the light of heaven, and he was the centre of a cult which gradually petered out, which is perhaps as well.

The 600 drachma value shows no famous figure, but merely that of a young Greek boy. He is here as representing the youth of Greece who took part in the original Olympic games. Then, as now, there was an interval of four years between successive Games, and the period in between was known as an Olympiad.

We are supposed to be mad on sport today, but those old Greeks could have taught us a thing or two about taking those games seriously, yet winners were merely given laurel wreaths for their pains. There were no gold medals in ancient Greece.

The 1,000 drachma stamp shows another head, that of Alexander the Great. First history tells of Alexander breaking in his horse Bucephalus, which carried him through the wars that made him a world conqueror. A genius in more ways than that of a soldier, he founded many cities, including Alexandria in Egypt. Another of his feats was to form a great library to which scholars from all over the Mediterranean flocked.

On the 1,200 drachma value we see the head of a charioteer of Delphi. Great men these charioteers, for no feast days would be complete without their exciting chariot races. How exciting they were can be judged—perhaps!—by some of Hollywood's productions. The cinema magnates, like the ancient Greeks, love these things.

The 2,000 drachma gives us a change from the usual portrait, showing one of the famous Dipylon Vases, which mostly come from the Athenian Cemetery. These were popular during the period from about 1100 B.C. to 750 B.C., to be replaced later by vases known as the Corinthian type. The latter can be distinguished by the intricate oriental designs. Wouldn't it be nice to own a vase like the one shown on the stamp? As that is not possible, let us be glad of the stamp that gives such a clear picture of the treasure.

Now we come to the 2,400 drachma stamp, picturing three hounds hunting a wild boar. This picture is a wonderful example of Greek art, which is said to

have had its beginning in the Isle of Crete. Fostered by King Minos, love of swift movement was clearly depicted in an exceptional manner, and this trait could be noted in all forms of Greek art. Study this little stamp; it is well worth it.

Quite a story is attached to the picture featured on the 2,500 drachma stamp. It shows a happy youth (Continued on page 408)



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# Stamp Gossip

## WHOOPING CRANES

IT is easy to see, from letters received, how interested many readers are in animals and birds, so an article that appeared in *Stamps*, the New York philatelic magazine, on the question of whooping cranes in connection with a Canadian stamp is worth commenting upon. It would seem that there is a movement afoot to have this rare bird depicted on a 7c. value, because what they call a "one-in-a-million" photograph was snapped by a Mr. Fred Lahrman. This showed the bird in flight, and both American and Canadian philatelists are keen to have a record of these whooping cranes, which are now almost extinct owing to excessive hunting.

## TWO IN ONE

Quite a long time ago we were told what a fine set of stamps was in preparation for Kenya, Uganda and



Tanganyika—quite a mouthful, eh?—but never surely did a set of stamps take so long to print. We did get an advance view of one of the designs when the 1954 Royal Visit stamp appeared, for the new 30c. had been adapted for the commemorative, and an attractive stamp is the result. By now collectors will have their sets of Royal Visit stamps complete, and many will probably think that the nicest of the lot is this Kenya adaptation.

## ARE THEY EVER USED?

After my notes some time ago on the stamps of Liberia, a reader wrote to say that country didn't issue real stamps at all. As you can guess, he was a used stamp fan. Well, our friend was going a bit too far, for while it is true that Liberia, as I said in my comments, does cancel unsold balances, it is also true that a lot of Liberian stamps are genuinely used, for relatively it is quite a business-like country nowadays and a lot of mail passes in and out. The one illustrated actually came off a letter which the writer received recently.

## HOW MANY WORDS?

We often read of an industrious penman who has written a chapter of the Bible on a postage stamp, or has accomplished some such rather futile task. This may account for a letter I received from a reader who enclosed a commemorative from Panama and asked if I knew of any other that had more words printed on it.

Well, I certainly know of none. I wonder if any other reader does? The stamp was issued to commemorate the 50th anniversary of the founding



of the republic, and all that lettering in the centre is under the heading, in Spanish, "Act of Independence of the Isthmus." While I am quite conversant with the language, I am afraid that my eyes are not strong enough to read what the Act says! Anyhow, it is quite an interesting little stamp, and will fit into many kinds of thematic collections.

## ANOTHER CINCUENTENARIO

The Argentine have issued another stamp honouring a cincuentenario or 50th anniversary. This time it is connected with the founding of a Postal Radio Station in the Southern Orkneys. The stamp is a beauty, but it is probably produced for our consumption as much as anything else. It is really remarkable, this interest of the great South American republic in the Southern Regions. I lived for several years in what we call Patagonia. It was quite a long way from the regions in dispute, yet in those days any Argentinos there looked upon it as banishment, and lived merely for the day when they could return to their beloved Buenos Aires. No doubt even now they feel the same way about things. Still, prestige has to be considered; hence these fine stamps.

## AT LONG LAST

With most countries releasing sets of stamps every few months, it is hard to believe that a country will go for over twenty years with its definitive set, and merely be satisfied with a few commemorative issues. Yet that is the present position of South West Africa. But at long last a new set has been announced, and we look like being in for a treat in the way of designs, for 12 stamps from 1d. to 10/- are to be issued. Besides pictures of native women, there are to be more of wild animals on them and, most interesting of all, illustrations of the rock drawings to be found in this territory, done by natives long, long ago. We can only hope that the stamps will do justice to the subjects selected.

About the same time South Africa itself will bring out a new set of stamps. All will depict wild animals to be found in that country, and where is there another that can produce such a Zoo? Lions, elephants, leopards, etc., etc.! What a set it will be for the thematic collector. The stamps of South Africa are among the most popular in the world with philatelists who go in for modern stamps, as they provide so much material for study in the way of shades, flaws, etc. In this respect the present set will be greatly missed when it becomes obsolete.



# Competitions! Open To All Readers

*Prize-winning entries in M.M. competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.*

## What Cars are These?



### Car Faces

It is several years since we had a Car Faces competition, so this month we are giving readers another opportunity of proving that they can recognise up-to-date cars by them. The composite illustration on this page shows the fronts of 10 modern British cars. Readers are asked to make a list of these in order, giving with each number the name of the car that it represents. Enough to identify the model completely is required.

There will be separate Sections for Home and Overseas readers, and in each prizes of 21/-, 15/- and 10/6 will be awarded, with consolation prizes for other good efforts. Write your name, address and age on your entry, and forward it to *Car Faces Contest, Meccano Magazine, Binns Road, Liverpool 13*. Closing dates: Home, 30th September; Overseas, 31st December.

### Summer Holiday Photo Contest

There is still time to enter the best of your 1954 holiday snapshots in our Summer Holiday Photographic Contest. On this occasion more than one photograph may be submitted, but no competitor will be awarded more than one prize. Photographs must have been taken by the competitor, who must state what each picture represents, and give his address and age.

The competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photographs are entered. There will be separate Overseas Sections. In each section prizes of 21/-, 15/- and 10/6 will be awarded. Post your entries to: *Summer Holiday Photo Contest, Meccano Magazine, Binns Road, Liverpool 13*. Closing dates: Home Section, 31st August; Overseas Section, 30th November.



# Competition Results and Solutions

## HOME

### MARCH 1954 PRICE CODE CONTEST

1st Prize: R. H. Harper, Sutton Coldfield. 2nd Prize: M. T. Furniss, Sheffield 8. 3rd Prize: S. Harrison, Waterlooville. Consolation Prizes: D. J. Walker, Middlesbrough; K. A. Walton, Leicester; M. G. E. English, Pontypridd; W. R. Farwell, Ewell; I. Wigglesworth, Hounslow.

### APRIL 1954 PHOTOGRAPHIC CONTEST

1st Prize, Section A: G. Ogilvie, Edinburgh 4; Section B: D. W. Allan, Rock Ferry. 2nd Prize, Section A: S. S. Pethybridge, Newton Abbot; Section B: J. K. Jones, Kegworth. 3rd Prize, Section A: J. W. Whitelaw, London N.2.; Section B: M. Warriner, Wallasey. Consolation Prizes, Section A: R. H. Morling, Lowestoft; S. Redhead, Hull. Section B: T. R. Cookson, Bournemouth; A. Child, Guiseley, nr. Leeds; J. Wright, North Walsham.

### APRIL 1954 LOCOMOTIVE CONTEST

1st Prize: R. A. Hollingsworth, Warsop. 2nd Prize: R. Patmore, Hatfield. 3rd Prize: E. Edgar, Crieff. Consolation Prizes: J. McMillan, Hurlford; W. Ritchie, Pumpherton; J. Reece, Andover, M. Winters, Wigan.

## OVERSEAS

### NOVEMBER 1953 CROSSWORD PUZZLE

1st Prize: G. J. Binnie, Waihi, N.Z. 2nd Prize: R. McRobert, Port Elizabeth, S. Africa. 3rd Prize: Chan Heng Woh, Perek, Malaya. Consolation Prizes: J. A. Chappell, Beresfield, N.S.W., Australia; C. J. Touryan, Beirut, Lebanon; F. R. Ross, Halifax, N.S., Canada.

### NOVEMBER 1953 RAILWAY PAINTING CONTEST

1st Prize, Section A: L. F. Meats, Christchurch, N.Z.; Section B: A. R. Walsh, Dublin, Eire. 2nd Prize, Section A: J. S. Johnson, Wellington, N.Z.; Section B: G. Jackson, Cape Town, S. Africa. 3rd Prize, Section A: L. Marsh, Port Elizabeth, S. Africa; Section B: J. S. Smith, Invercargill, N.Z. Consolation Prizes: F. J. Neil, Auckland W.1, N.Z.; T. S. Wallace, Melbourne, Australia; P. Bryan, Christchurch, N.Z.; D. Desmond, Dalkey, Eire.

### DECEMBER 1953 BRIDGES CONTEST

1st Prize: T. B. Gibson, Gibraltar. 2nd Prize: H. Leah, Valletta, Malta, G.C. 3rd Prize: M. G. Peters, Edmonton, Canada. Consolation Prizes: H. Veiriere, Brussels, Belgium; L. S. Dawson, New York 10, U.S.A.; T. Astley, Melbourne, Australia.

### DECEMBER 1953 ADVERTISEMENT CONTEST

1st Prize: E. C. Dunsford, Marsa, Malta, G.C. 2nd Prize: T. Searson, Salisbury, S. Rhodesia. 3rd Prize: B. Heywood, Auckland, S.3, N.Z. Consolation Prizes: A. H. Godfrey, Nairobi, Kenya Colony; T. S. Sanganeria, Bombay, 10, India; D. M. Heaslip, Limerick, Eire.

### DECEMBER 1953 PHOTOGRAPHIC CONTEST

1st Prize, Section A: J. Moreland, Adelaide, Australia; Section B: P. S. Cameron, Melbourne, Australia. 2nd Prize, Section A: R. Vanwetswinkel, Beverlo, Belgium; Section B: T. Vallem, Christchurch, N.Z. 3rd Prize, Section A: T. Melvyn, Canberra, Australia; Section B: D. Seligmann, Cape Town, S. Africa. Consolation Prizes: R. Walsh, Gordon, N.S.W., Australia; P. J. Nelson, Hastings, N.Z.; G. D. Gogar, Dublin, Eire; S. Kidd, Otago, N.Z.; S. Ticktin, Cape Town, South Africa.

### JANUARY 1954 COVER VOTING CONTEST

1st Prize: M. S. F. de Peralta, Buenos Aires, Argentina. 2nd Prize: T. E. de Jong, Amsterdam, Z., Holland. 3rd Prize: J. Berragan, Invercargill, N.Z. Consolation Prizes: L. A. Sharp, Auckland, N.Z.; R. Fairley, East Rand, S. Africa; M. Gardner, Christchurch, N.W.2, N.Z.

### JANUARY 1954 DRAWING CONTEST

1st Prize: J. S. Stevens, Petone, N.Z. 2nd Prize: V. Taylor, Montreal, Quebec, Canada. 3rd Prize: K. Knight, Porongorups, W. Australia. Consolation Prizes: P. Churchley, Melbourne, E.10, Australia; W. van der Merwe, Cape Town, S. Africa; L. Christopher, Ohio, U.S.A.; M. Hunt, Sliema, Malta, G.C.; B. Gould, Waterford, Eire; P. Gomes, East London, S. Africa; N. Jensen, Copenhagen, S. Denmark; T. Tyler, Auckland, N.2, N.Z.

## SOLUTIONS

### DECEMBER 1953 ADVERTISEMENT CONTEST

Bond's, B.T.H., Cox, Dinky Toys, E.H.W., E.M.I., ERG., Fry's, Gamages, Grain, H.A.C., Hamleys, Hornby, Lines, Malins, Meccano, Mercers, Northern, S.E.L., Spear, Tatlow, Windsor, Wright, Yeoman.

### JANUARY 1954 COVER VOTING CONTEST

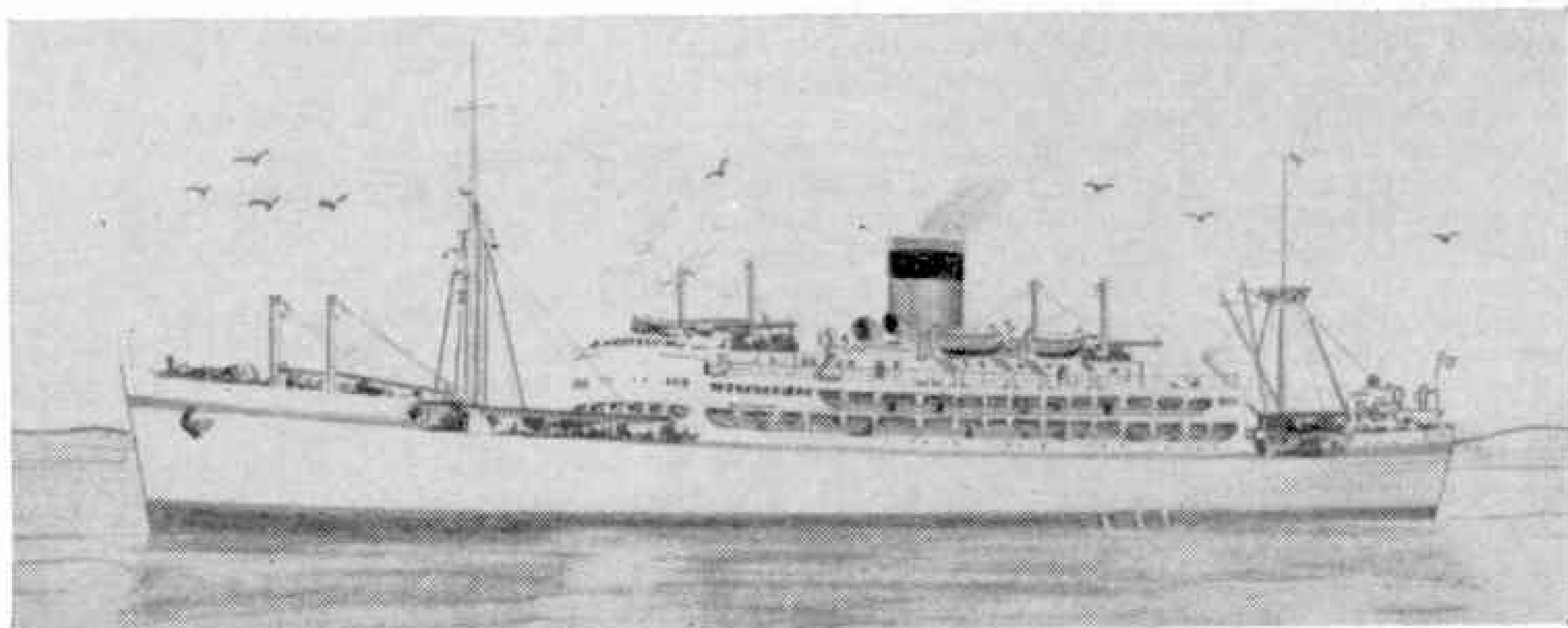
1, June. 2, March. 3, July. 4, May. 5, January. 6, December. 7, October. 8, November. 9, April. 10, August. 11, September. 12, February.

### FEBRUARY 1954 LOCOMOTIVE CONTEST

Looking from left to right, top line: Class 8P 4-6-2 *Princess Royal* Class, L.M.R. *Battle of Britain* or *West Country* class 4-6-2, S.R. L. and Y. 2-4-2 Tank, L.M.R.; centre: Class A4 4-6-2, E. & N.E. 0-6-0 Tank class A1X, Ex-LBSCR., S.R. *King Arthur* class N.15 4-6-0, S.R.; bottom line: Gresley 4-6-2, E. & N.E. 16XX Class 0-6-0 Tank, W.R. Class 5 4-6-0, L.M.R.

### MARCH 1954 PRICE CODE CONTEST

Code word— C H E L M S F O R D  
1 2 3 4 5 6 7 8 9 0



The October 1953 Ship Drawing Contest proved to be very popular with overseas readers, and we reproduce here the prize winning entry submitted by Michael Adler, Cape Town, aged 15.

Atomic Age Fighters—(Continued from page 372)

skids or hydro-skis, or even to belly-land on a rubber deck fitted with carrier-type arrester gear. This would necessitate a change to turbojet or rocket-power; but this seems inevitable in time anyway, as nobody has yet perfected a supersonic turboprop, and the 500 m.p.h. top speed of the XFY-1 and XFV-1 is hardly fast enough for modern interception.

Nevertheless, they represent a bold step in the right direction, and Lockheed, Ryan and other companies are known to be developing also V.T.O. aircraft for the U.S.A.F., to defend vital targets miles from the nearest airfields. These machines will almost certainly be turbojet-powered and, if they work, they will bring nearer the day when we can say good-bye to long, expensive military airfield runways and large aircraft carriers.

The Tulip Rally in a Consul—

(Continued from page 376)

Imagine our delight when we reached Luxembourg, the next morning, on the homeward run to Holland, to discover that our two Consuls were the only cars left in their Class without loss of marks.

From Luxembourg to the final control at Noordwijk aan Zee was merely a monotonous sunny nine-hour run enlivened after crossing the Dutch Frontier by a vociferous welcome from thousands of Dutch Rally enthusiasts, the decorating of the Consul with the traditional Tulip Wreath and the free use of the magnificent Phillips Factory canteen, complete with electric razors!

After the technical inspection, passed by all the Fords with flying colours, our team met in our hotel, and we anxiously compared notes. To our delight, in spite of the misfortunes of Cuth Harrison and Nancy Mitchell, Reg Phillips and Denis Scott were leading their Class with the Zephyr, Gatsonides was leading his Class with an Anglia, we had virtually won our Class, and what pleased us more, Bill Fleetwood and George Reed were an undisputed second to us. It was a tired but happy Works Team that left for England the following day.

Stamp Collectors' Corner—(Continued from page 403)

carrying across his shoulders a calf that he had been too late to deliver for sacrifice, as was a Greek custom in those days. Back went the youth with the animal, which lived to grow into a cow to produce an abundance of milk, hence the smile.

Another stamp with an intriguing design is the 4,000 drachma. This depicts Dionysus on his voyage. Bacchus—his other name—discovered the culture of grapes, and spent many years abroad, returning later to Greece. He had all kinds of adventures which there is no room to tell here, but for fancifulness not even Greek folklore has anything to beat it.

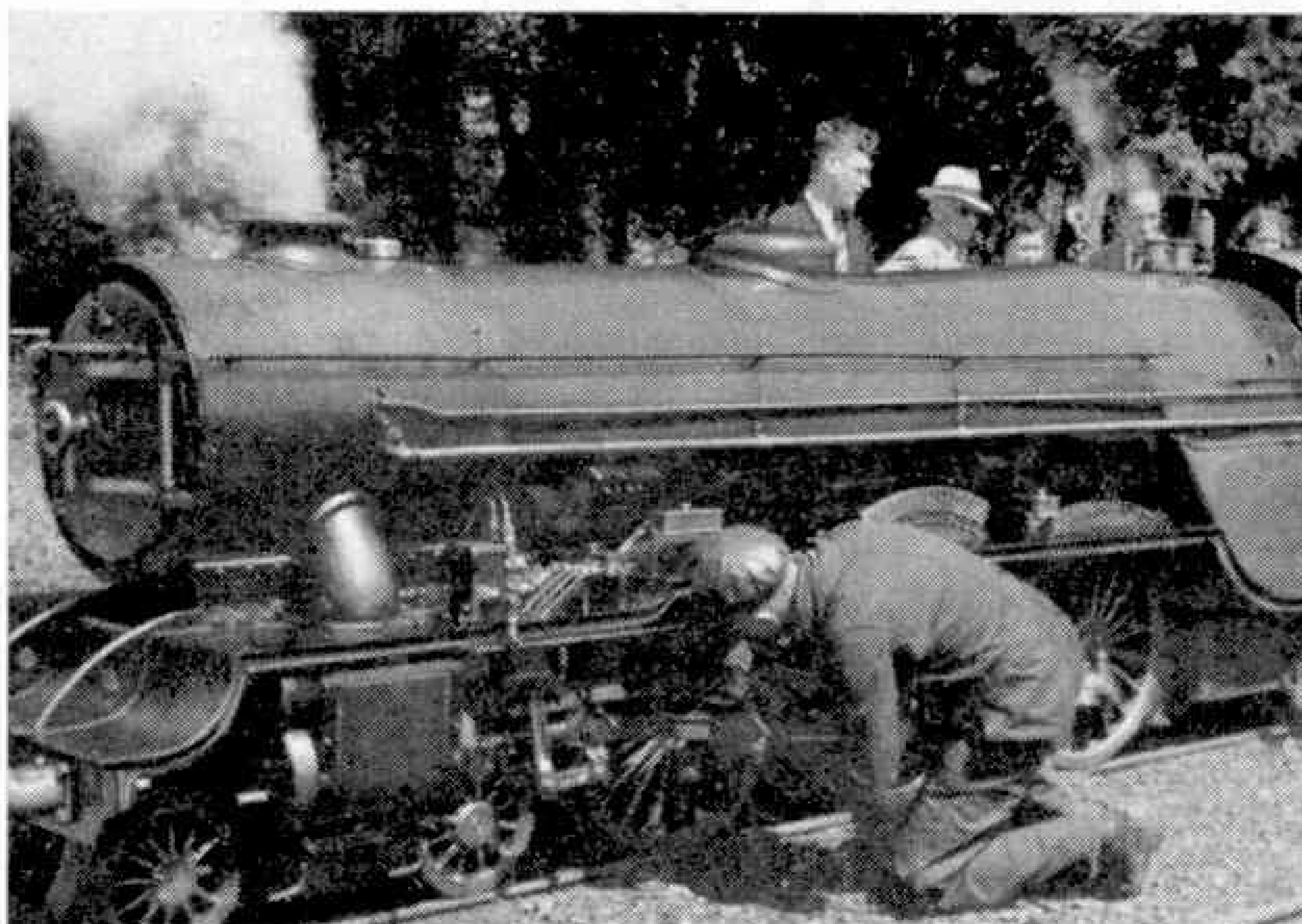
And now we come to the top value, the 20,000 drachma. Greek pitcher bearers are shown. Who knows whether they are carrying water or wine for some Bacchanalian feast, and who cares? For the stamp is quite delightful and rounds off one of the most interesting sets ever issued.

I do hope that no great Greek scholar reads these lines, for we all remember from our school days how such gentlemen love to argue, and they would certainly be able to pick holes in my timid classical

essay. But never mind, get this set, and then go to the public library for books on Greek mythology so that you can read those fascinating stories. Pick out the tit-bits to write up your set when mounted, and surely the result will interest everybody, even if they don't collect stamps.

New Model—(Continued from page 395)

Parts required to build the model Destroyer: 5 of No. 1; 11 of No. 2; 2 of No. 2a; 8 of No. 3; 1 of



Oiling round at Hythe on the 15 in. gauge Romney, Hythe and Dymchurch Railway. The engine, one of the well-known one-third full size Pacifics of the R. H. and D., was photographed by M.M. reader J. I. Dibley, of Bexhill-on-Sea.

No. 4; 6 of No. 5; 3 of No. 6; 12 of No. 6a; 2 of No. 8; 2 of No. 9a; 2 of No. 9d; 2 of No. 9f; 11 of No. 10; 3 of No. 11; 25 of No. 12; 2 of No. 12c; 1 of No. 13a; 2 of No. 15; 2 of No. 16; 4 of No. 16a; 6 of No. 17; 2 of No. 18b; 16 of No. 35; 207 of No. 37a; 170 of No. 37b; 52 of No. 38; 1 of No. 40; 4 of No. 45; 2 of No. 48; 7 of No. 48a; 4 of No. 51; 1 of No. 52; 2 of No. 59; 3 of No. 63; 1 of No. 77; 2 of No. 80c; 2 of No. 90a; 2 of No. 103h; 5 of No. 111; 6 of No. 111a; 6 of No. 111c; 2 of No. 111d; 5 of No. 126; 1 of No. 164; 4 of No. 176; 1 of No. 179; 2 of No. 186; 7 of No. 188; 7 of No. 189; 4 of No. 192; 4 of No. 212; 2 of No. 212a; 4 of No. 214; 2 of No. 215; 6 of No. 221; 1 of No. 222.

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# Fireside Fun

"Thanks for the pie, lady" said the tramp. "It was really perfect."

"Meaning what?" said the suspicious lady.

"Meaning," said the man, "that if it had been any better, you would never have given it to me; and if it had been any worse, I could never have eaten it."

\* \* \*

An old lady was given an egg boiler for her birthday. "Very nice of you," she said to the donor, "but I boil my eggs by the traffic lights out there—three reds and a couple of greens is just how I like them."

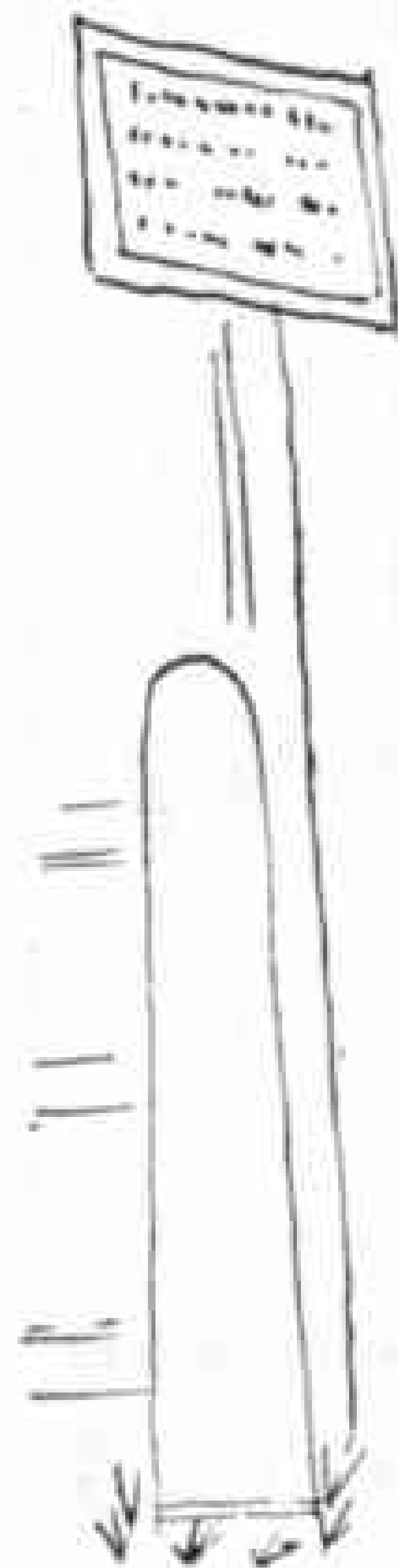
An Englishman lost in a mist on a Scottish moor met a native and said: "I am lost."

The native replied: "Is there any reward for findin' ye?"

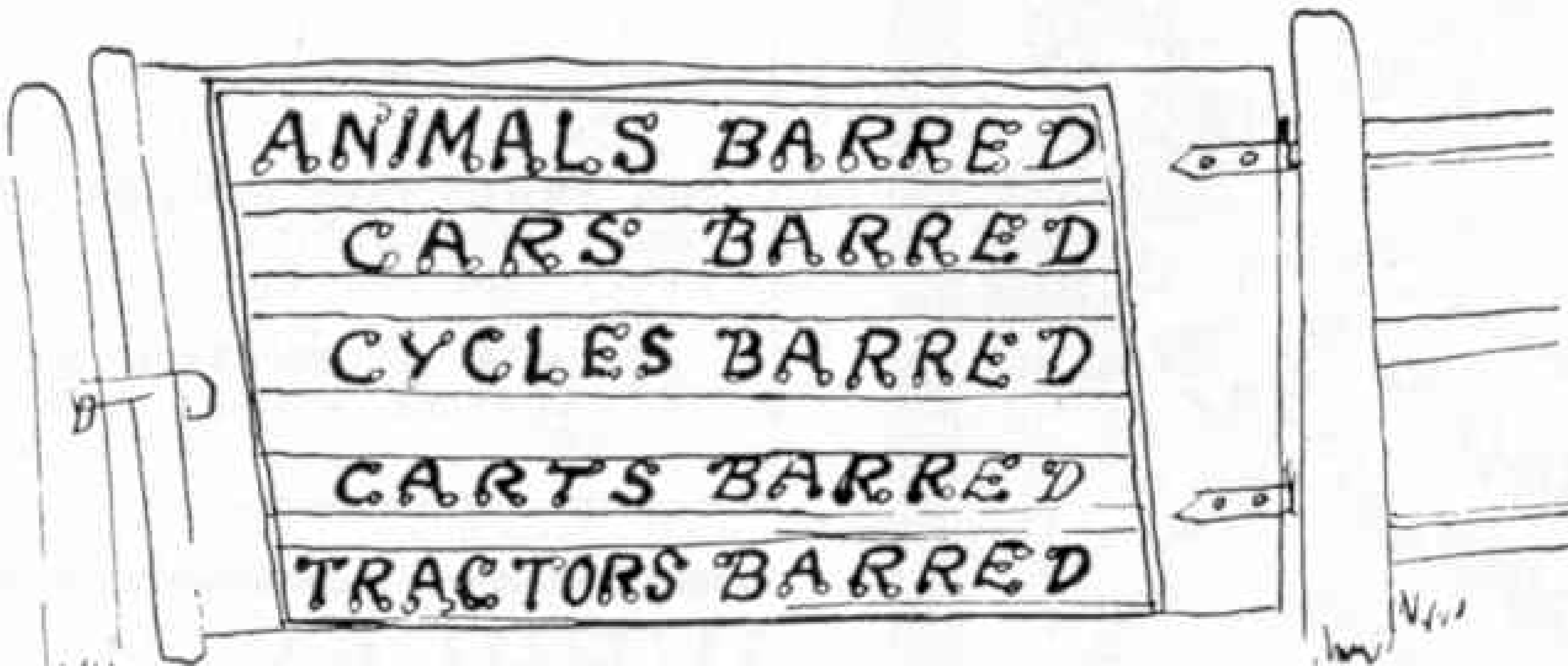
Englishman: "No."

Native: "Then ye're still lost."

\* \* \*



Five-barred Gate.



*Malabar.*

A teacher wishing to impress on his pupils the need of thinking before speaking, told them to count fifty before saying anything important, and one hundred if it was very important.

Next day he was standing with his back to the fire when he noticed several lips moving rapidly.

Suddenly the whole class shouted: "Nine-ty-eight, nine-ty-nine, a hundred. Your coat's on fire, sir!"

\* \* \*

A man entered a country post office. "Have you a parcel for Mr. Jones," he asked.

"Ay," said the postmaster, "but how do I know you to be him?"

The man produced a photograph of himself. "Have a look at that," he said. "It's me, isn't it?"

"My, so it be," said the postmaster, handing over the parcel without another word.

\* \* \*

Labour Manager: "Your application says that you worked for your previous employer for sixty years, yet you are only fifty years old. How do you account for that?"

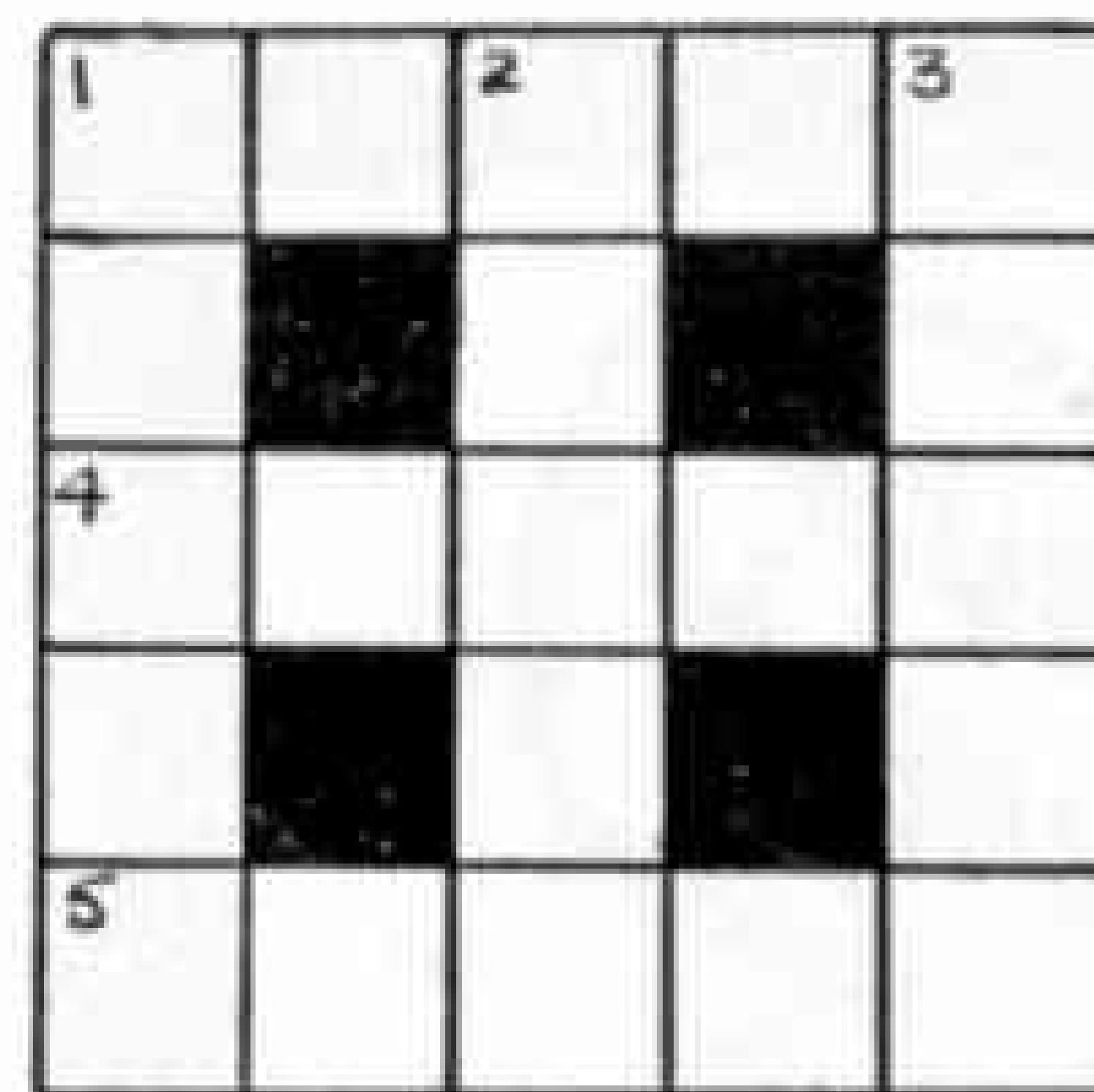
Applicant: "Overtime."

\* \* \*

Foreman: "Why my boy—work should be a pleasure. You should enjoy every minute of learning your trade."

Apprentice: "Blimey—you'll be asking me to pay entertainment tax next."

## BRAIN TEASERS



### A FIVE-MINUTE CROSSWORD

Clues

Down

1. Parts of the ears.
2. A vicious snake.
3. A most useful kind of grass.

Across

1. Gentle as "-----"
4. Much in the news.
5. A loose covering sometimes worn by women.

\* \* \*

## HIDDEN WORDS

Can you construct four or more separate words using in each of them all the five letters printed below.

S L E P A

\* \* \*

## SOLUTIONS TO LAST MONTH'S PUZZLES

### Find the Four Animals

The names of the four animals concealed in the letter codes are as follows: CAT, BEAR, HORSE, COW.

The letter code used was as follows: each letter in the alphabet is represented by the figure indicated.

A	B	C	D	E
2	1	3	6	4
F	G	H	I	J
7	8	5	14	9

K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
15	10	16	18	11	17	19	12	23	20	13	24	22	25	21	26

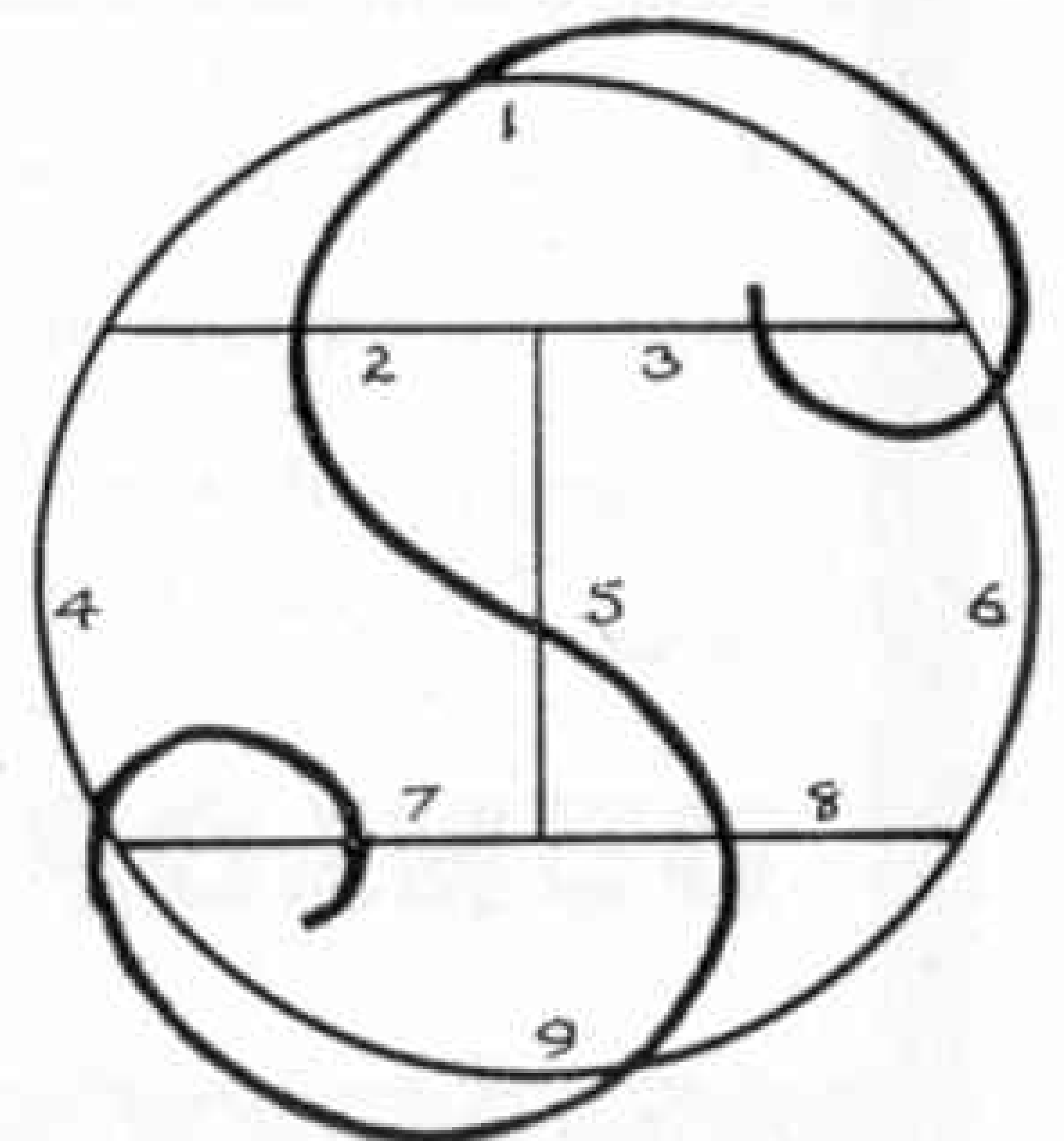
\* \* \*

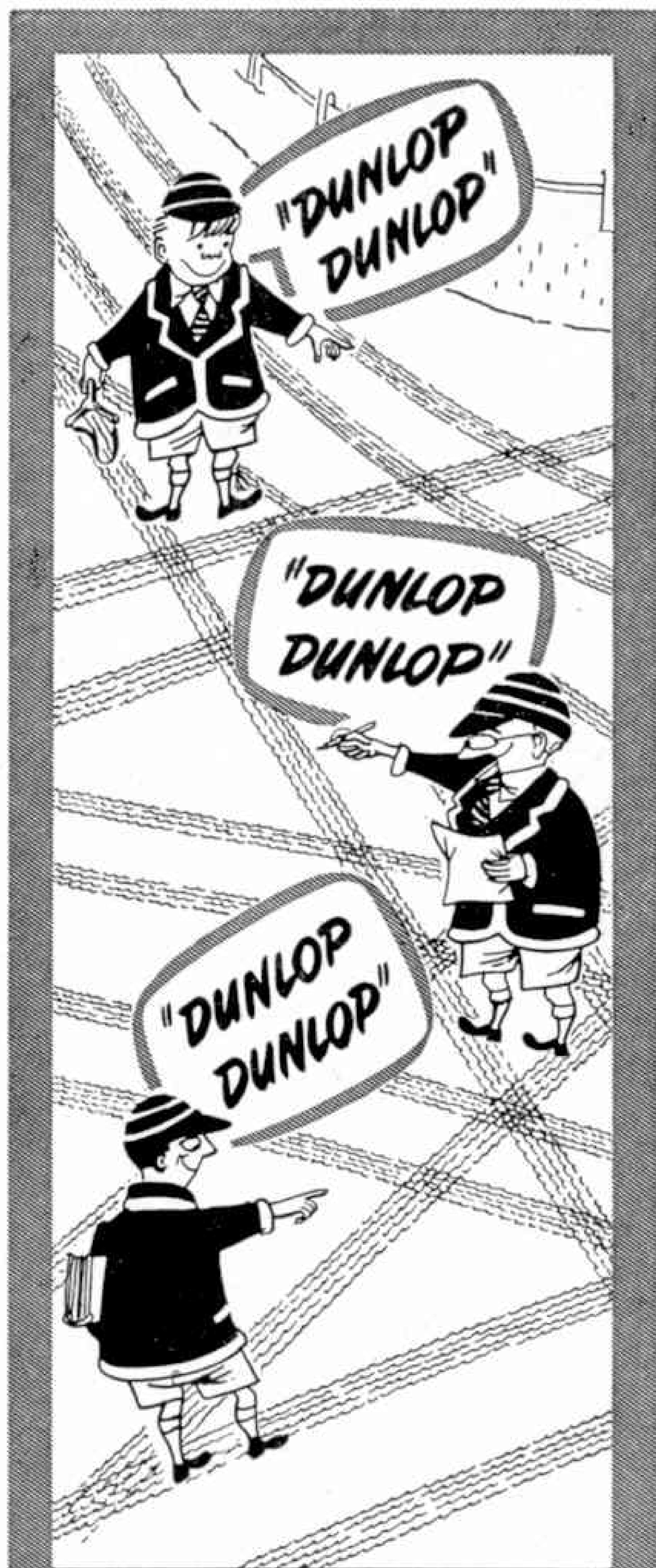
### Where Would You Be?

1. In a telephone box.
2. At the base of the Victoria Memorial in front of Buckingham Palace.
3. At the Cenotaph, Whitehall, looking towards Trafalgar Square, where stands the Nelson Column. On your left would be Downing Street in which is the official residence of the Prime Minister.

### Draw a Line

The sketch alongside shows how to draw one continuous line to cross once only each of the nine lines in the diagram.





It's more than an impression  
— it's a fact that more  
motorists than ever  
drive on —

**DUNLOP**



3H/118

## BOND'S

### PARTS FOR MAKING WAGONS

Spoked Wagon Wheels	Gauge	00	0
(2 wheels on an axle) ..	each	8d.	2/11
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Wagon Axle Guards ..	set of 4	1/9	1/4
Brass Buffers ..	each	3½d.	4d.
3-link Couplings ..	pair	7d.	6d.
High Capacity Wagon Bogies	pair	7/6	30/-
Standard Wagon Side Member, complete with axle boxes and buffer beams ..	set	1/9	—

### PARTS FOR MAKING COACHES

Disc Coach Wheels	Gauge	00	0
(2 wheels on an axle) ..	each	8d.	1/9
Coach Bogies, 4-wheeled type	pair	7/6	22/6
Coach Axle Guards ..	each	5½d.	8d.
Ventilators, Torpedo or Snail pattern ..	doz.	1/2	1/9
Corridor Connections ..	each	1/9	1/9
Dining Car Table Lamps ..	each	—	11d.
3-link Couplings ..	pair	7d.	6d.

<b>SCALE TYPE TRACK PARTS</b>	Gauge	00	0
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Raised 3rd Rail Chair	per 100	6/-	3/9
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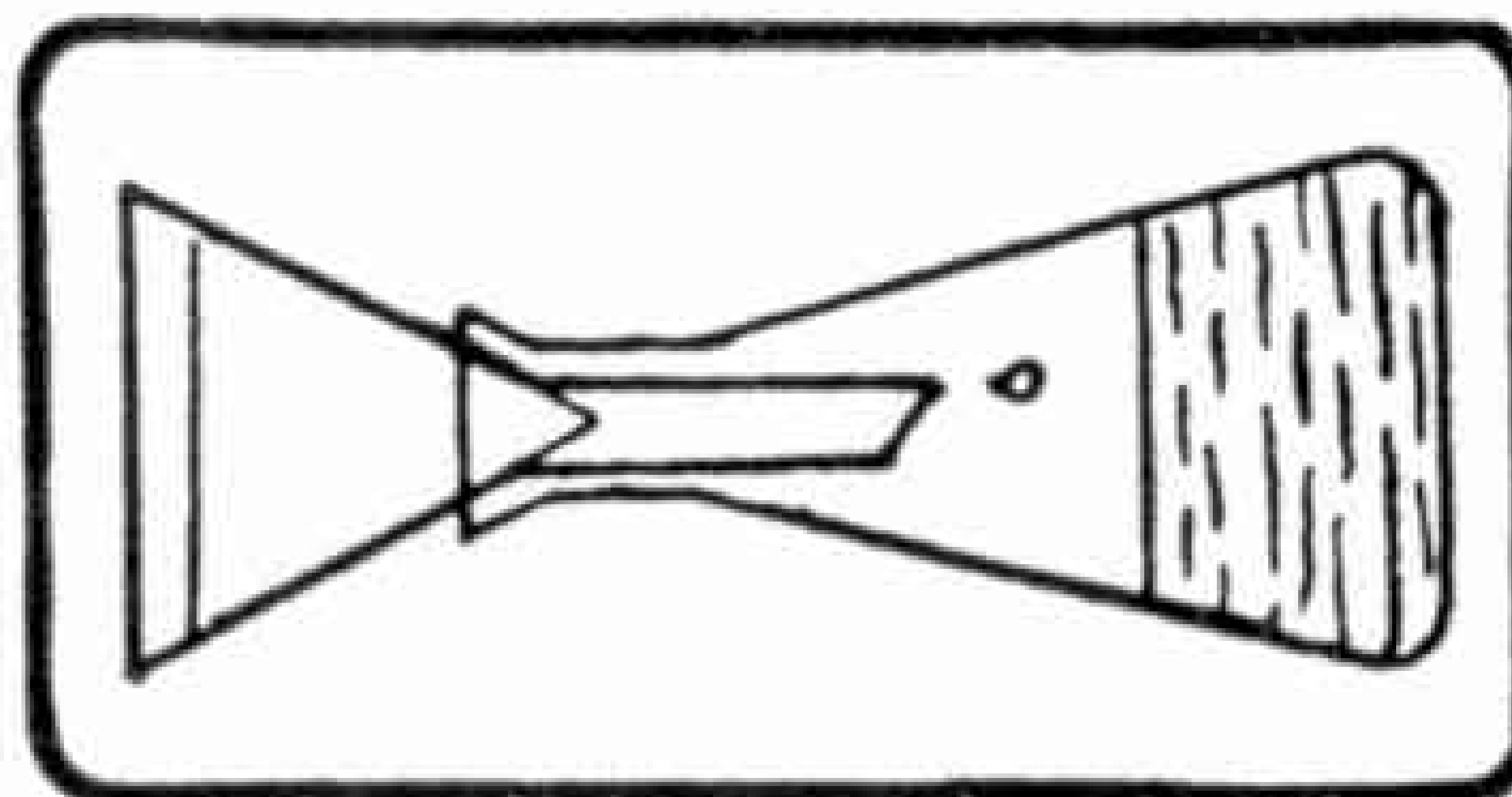


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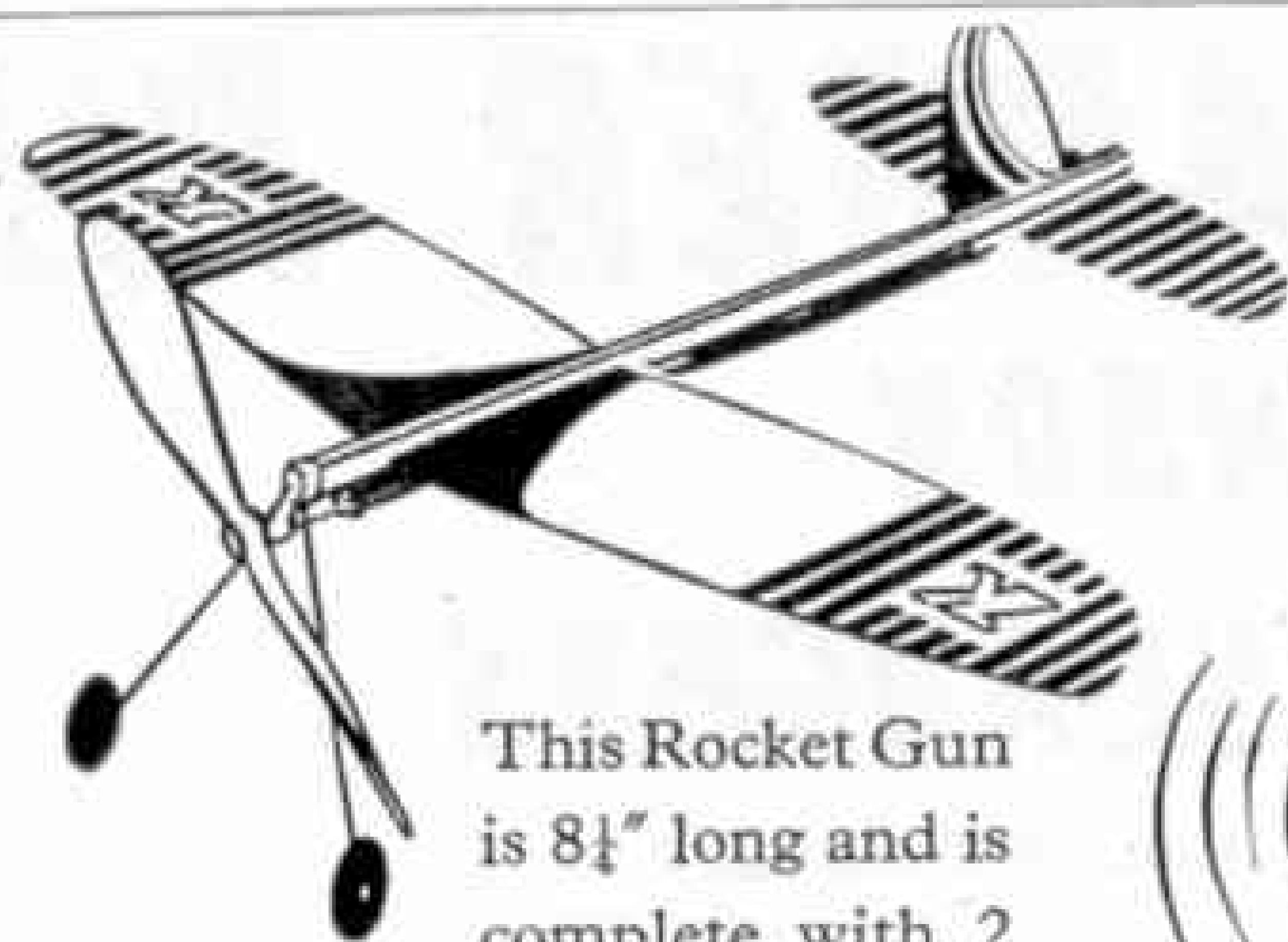
### Special! Trial Package

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**14 (D/MM) SURREY ROAD, BARKING, ESSEX**



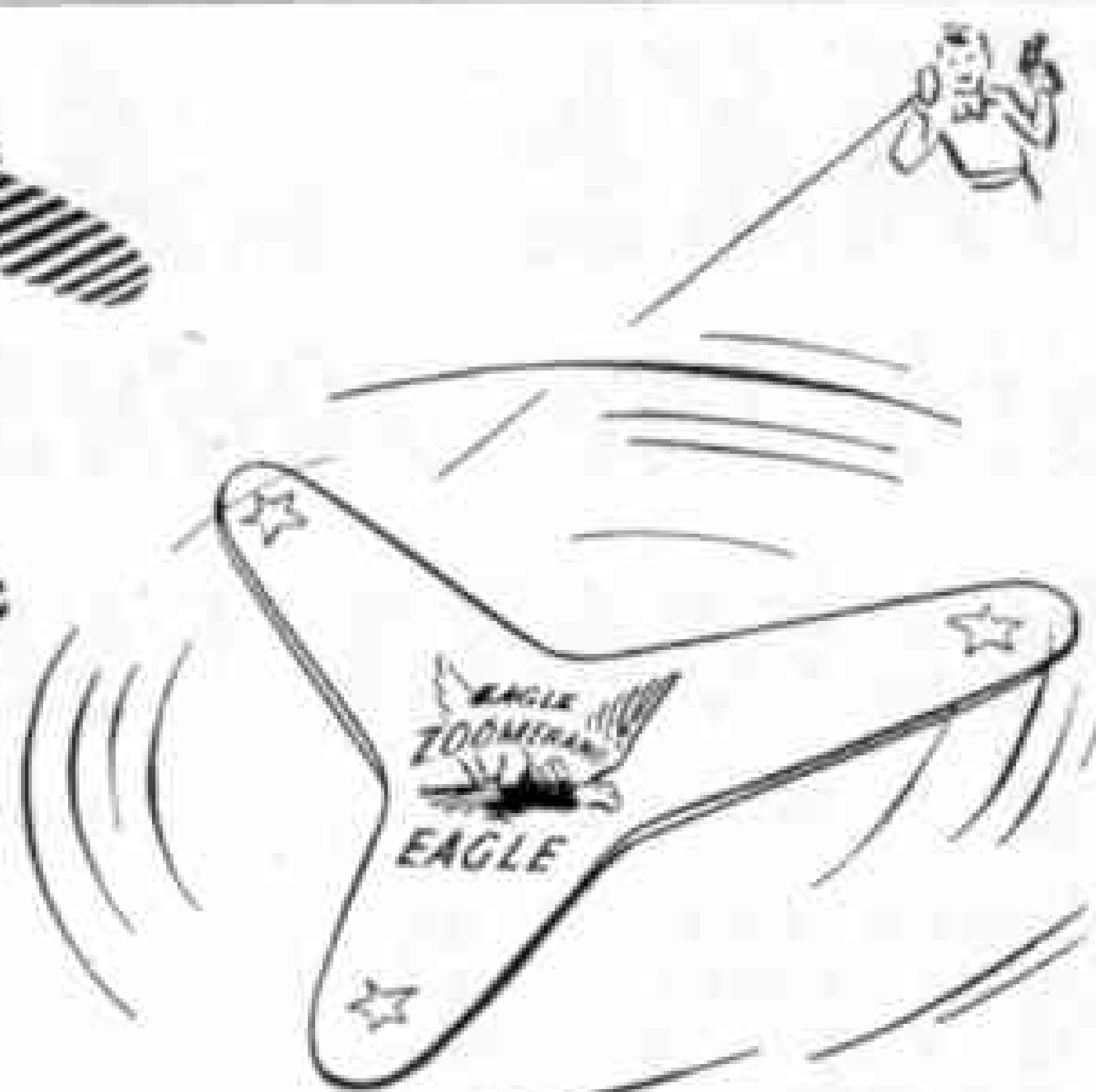
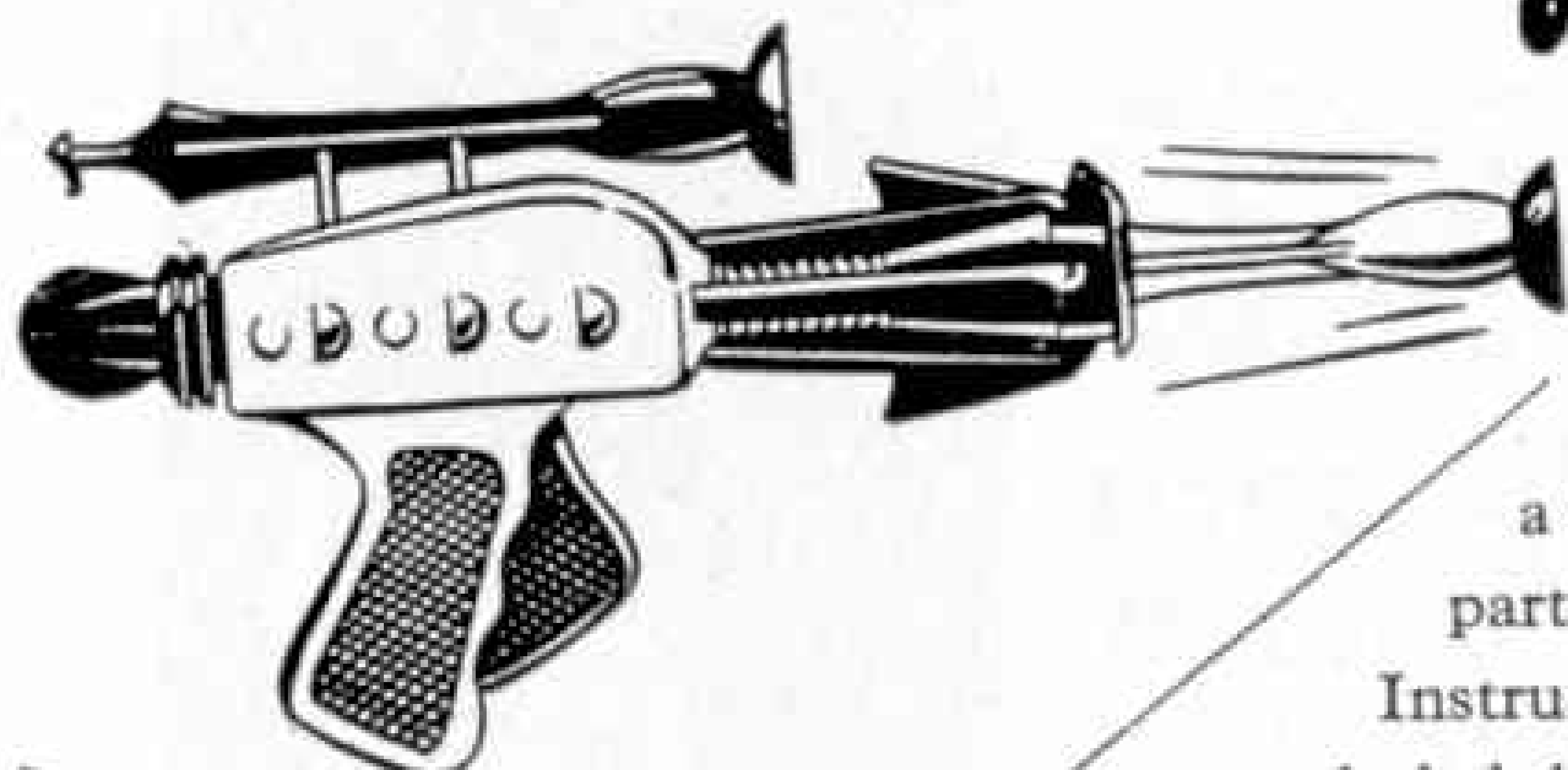
The "Gremlin" model needs no gluing and is complete with motor and ready to fly! Simple to assemble, this long range plane costs only 4/5. Post and packing 9d.



This Rocket Gun is 8½" long and is complete with 2 rocket projectiles fitted with suction pads.

Each projectile has a secret message compartment in the head.

Instruction leaflet is included in each box. Costs 6/11. Post and packing 9d.



The Eagle "Zoomerang" is a scientifically designed flying unit. Throw it as hard as you can and the Zoomerang will spin and climb, perform a slow barrel roll and return in your direction. Costs 3/11. Post and Packing 9d.



Space Ace Space Phone. Needs no batteries—just connect the two transmitter/receivers supplied. This walki-talki Space Phone has a range of up to 100 yards! Costs 2/11. Post and packing 9d.

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from  $2\frac{1}{4}$  in.  $\times$   $3\frac{1}{4}$  in. or 35 mm. negatives

Expense need no longer deter you from buying an enlarger. With the Johnson Exactum Postcard Enlarger you can make postcard-size prints from  $2\frac{1}{4}$  in.  $\times$   $3\frac{1}{4}$  in. (box camera size) or 35 mm. negatives. It is as simple to use as a contact printing frame. No focusing is required and there are no adjustments to make. Full instructions are enclosed with each Enlarger.

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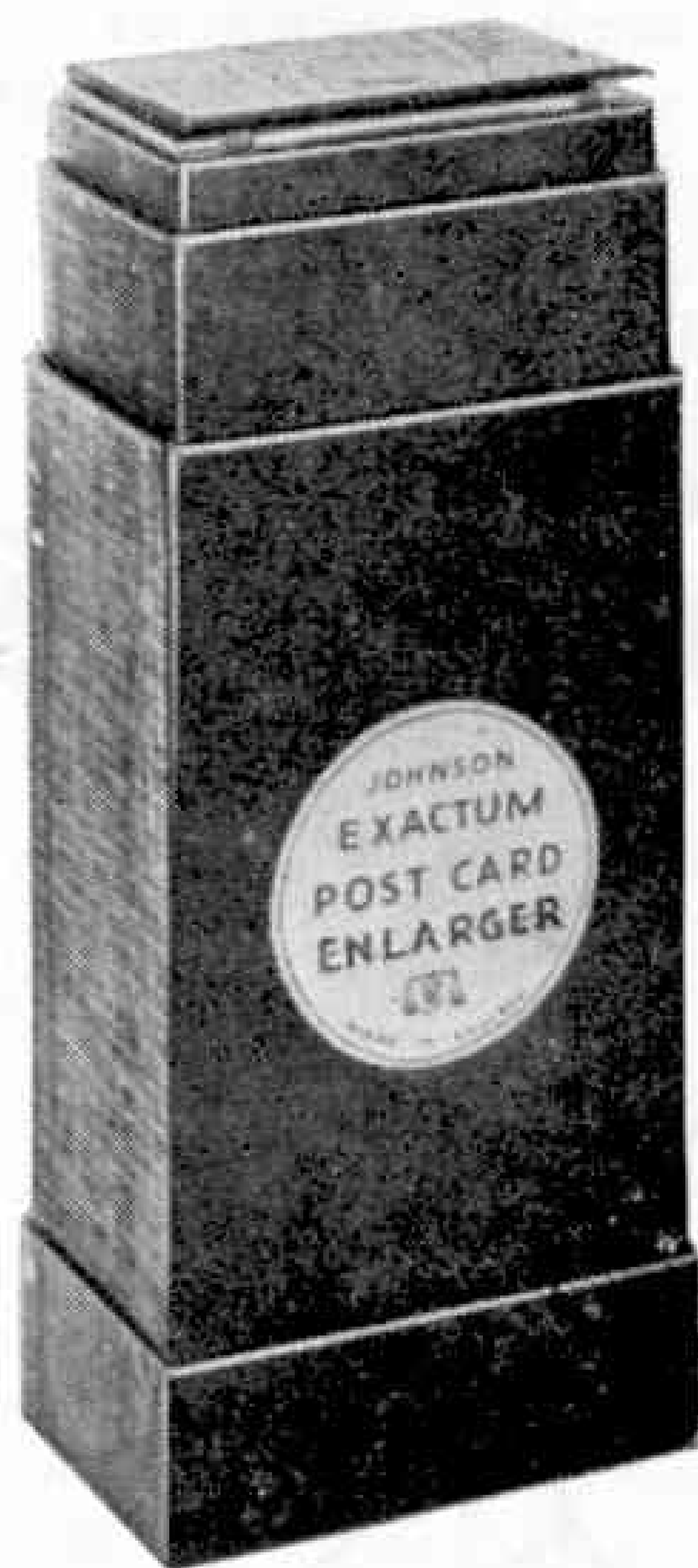
225 c.c. (8 oz.) size.....2/9 each

270 c.c. (20 oz.) size.....4/6 each



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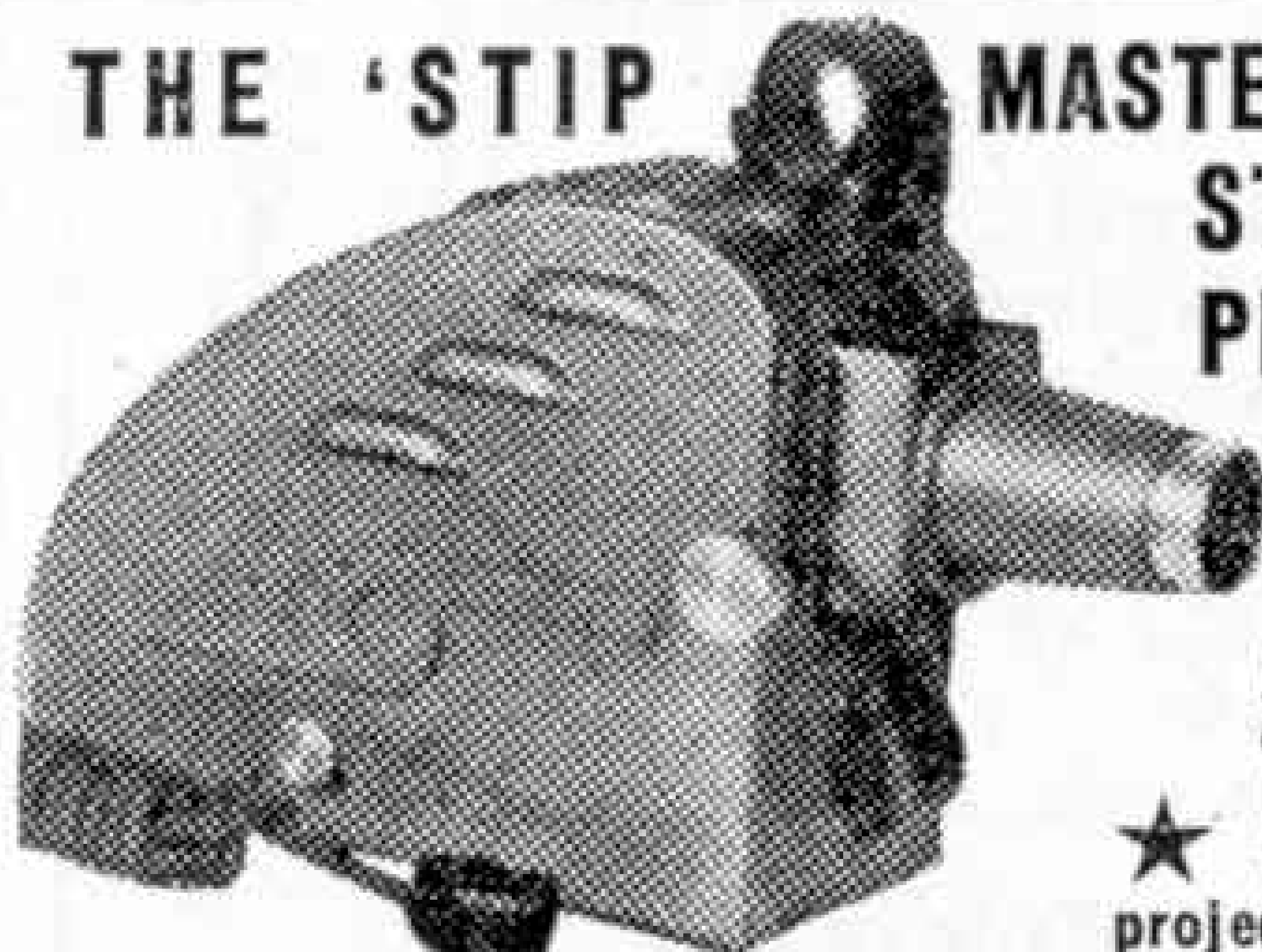
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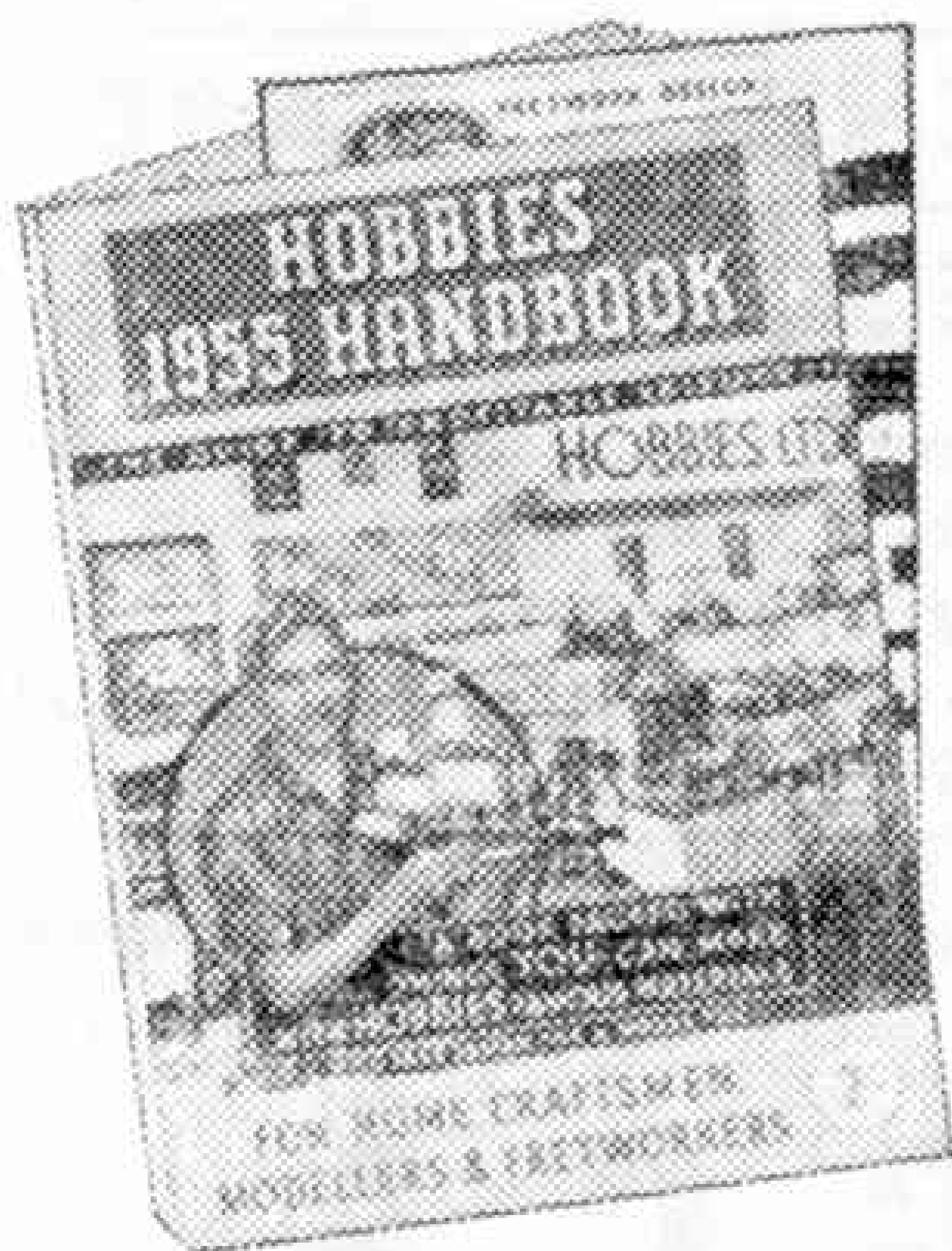
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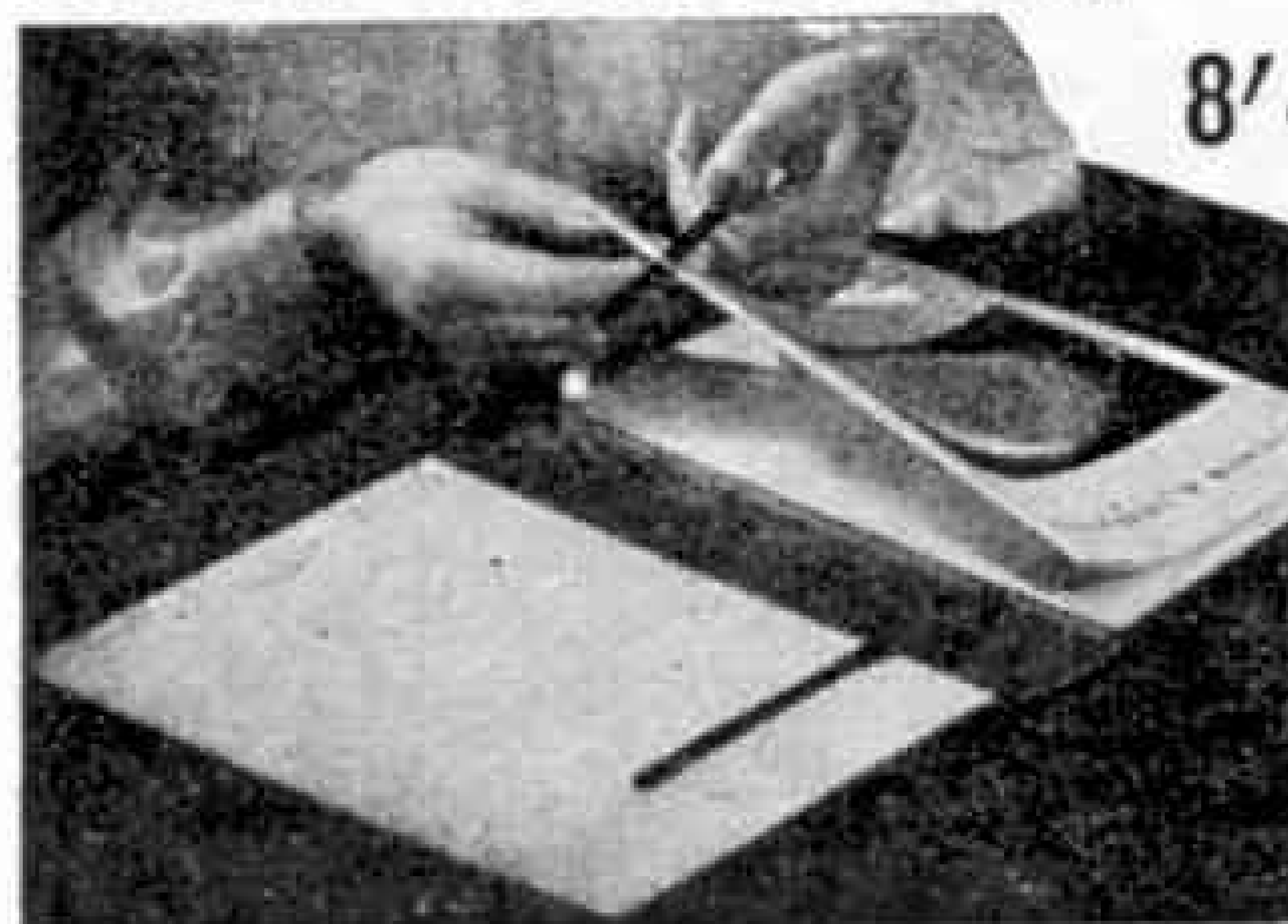
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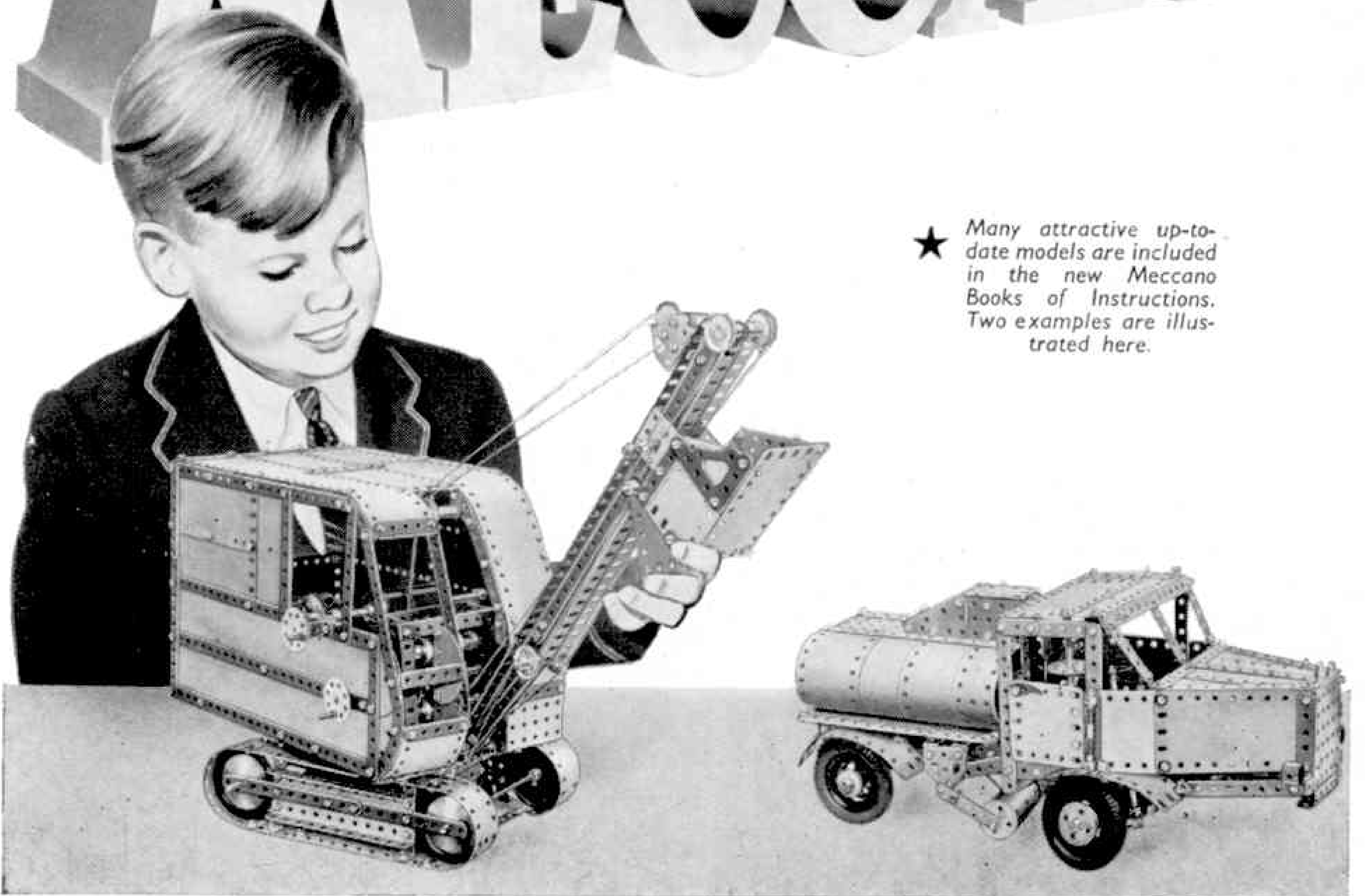


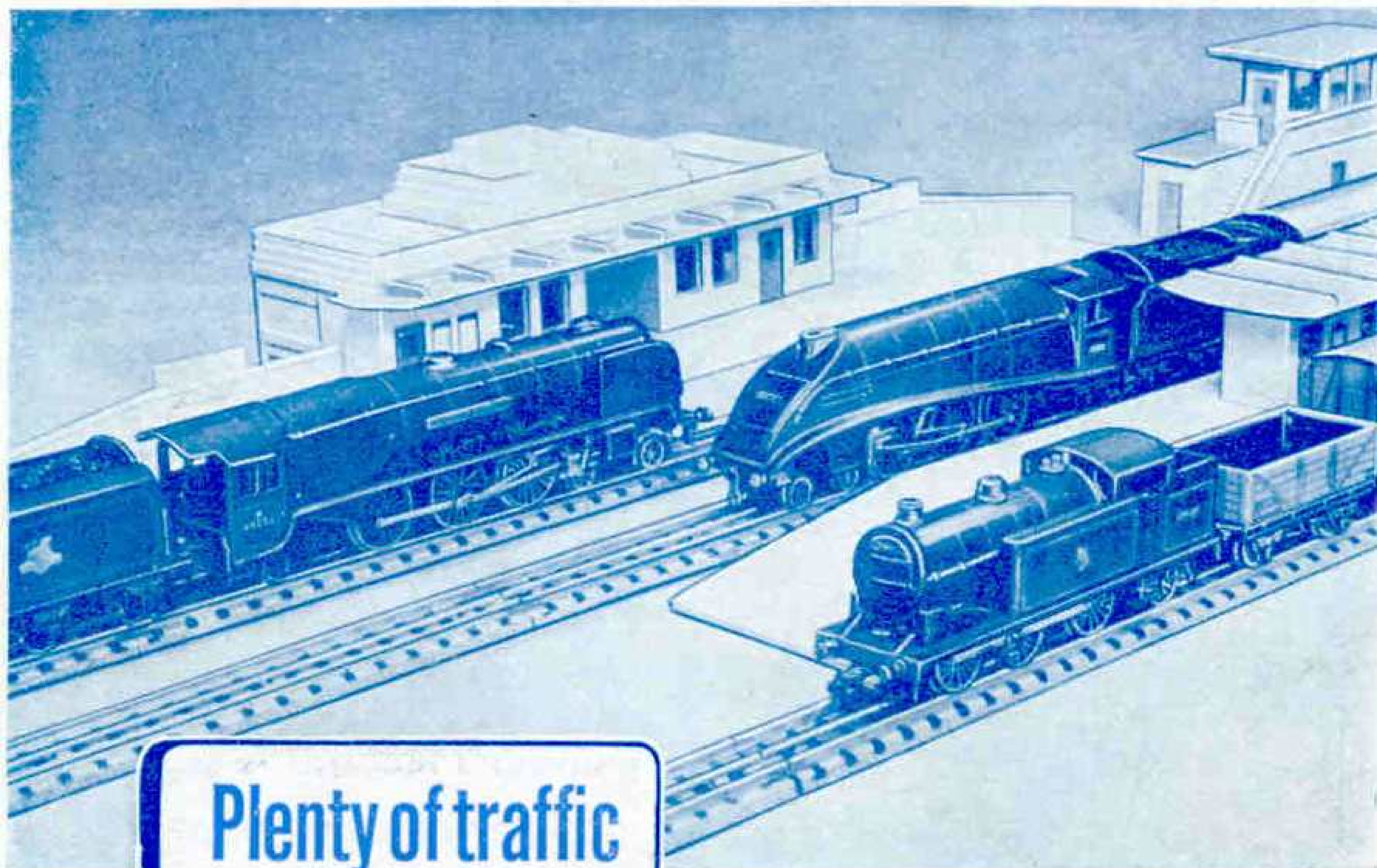
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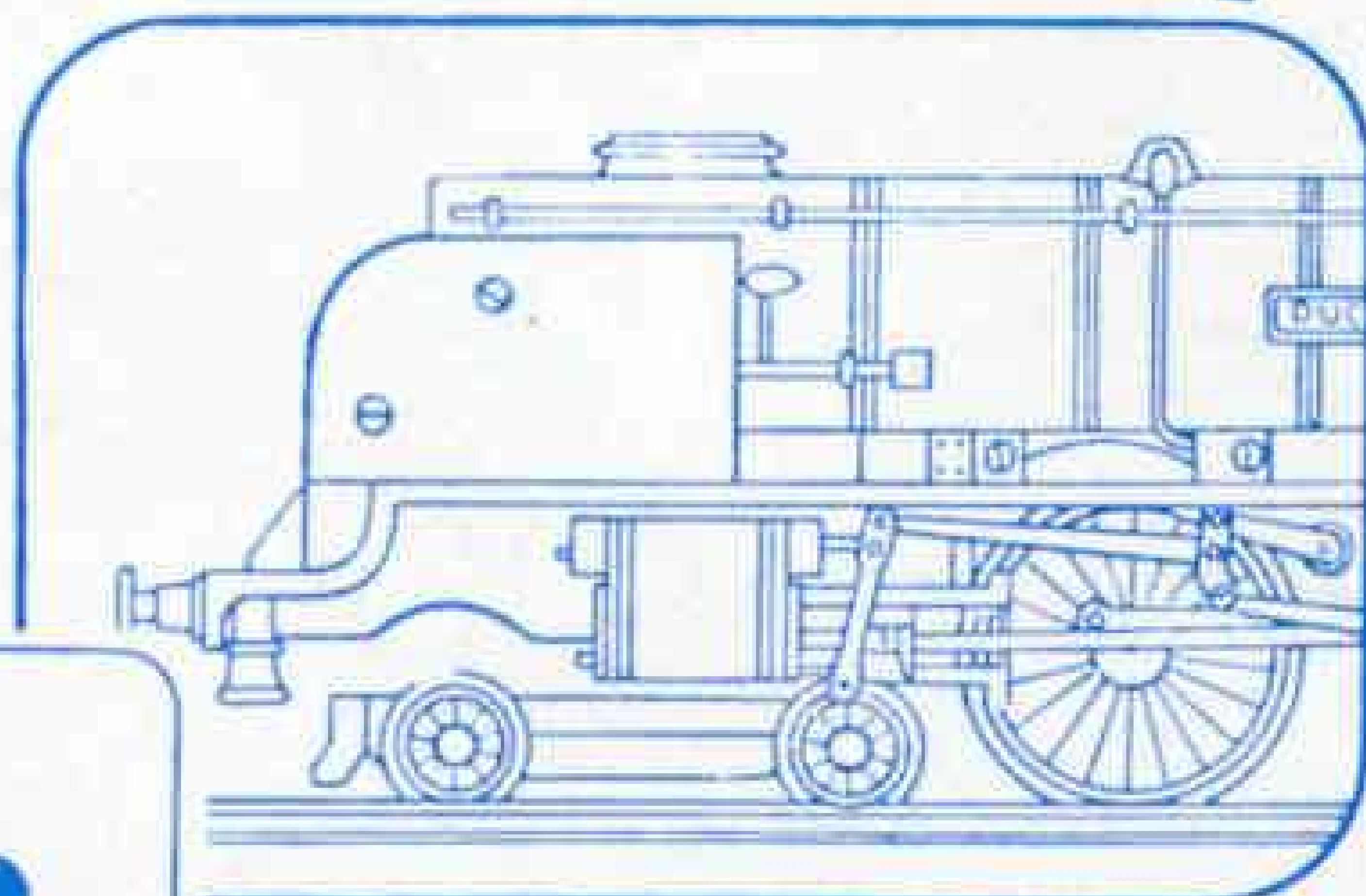




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